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Mrs Jay C. Roads

Pottsville, Penna.
April - 1 - 1943

THE COAL REGION

of

SCHUYLKILL COUNTY, PENNSYLVANIA

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An Historical and Statistical Review
of the Coal Trade

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By

Jay Oliver Woods

THE COAL REGION OF SCHUYLKILL COUNTY, Pennsylvania
is a new book, but one you can neither buy at your book-
store nor borrow at your public library.

It was written by a Schuylkill County native and
mining engineer, J. Oliver Roads. His widow, Mrs. Catherine
Matz Roads of 1339 West Market Street, has had four copies
of the book typed and bound, one of which she has given
to the Pottsville Free Public Library.

Mr. Roads spent the last months of his life on
this volume, which brings under one set of covers not
only a great deal about coal lands and coal companies
but also about this County's early railroads, iron
works, and canal.

Ghosts of many by-gone years stalk through this
record, and even in this paragraph from his introduction:

"In collecting and interpreting these records of
early mining, the author has compiled historical facts
and dates from the early engineers' maps and field notes
of Allen Fisher, John Hodgkiss, P. W. Sheaffer, Peter
Simpson, John Lewis, and from the later engineers--
Quillitch, Col. De Saul, General Pleasants, Harris Broth-
ers, Symons, Geary, The Philadelphia and Reading Coal
and Girard Estate records, with the additional informa-
tion quoted from Rodgers State Geological Survey of 1858,
and the private records of the writer."

Many people hereabouts quote Franklin B. Gowen's,
"I practiced law for seven years in the County of
Schuylkill and in all that time . . . there was but

three men who ever retired from the business of mining coal with any money . . . Every man's estate was settled by the sheriff before he died", but this book actually gives six solid pages of failures and sheriff's sales, in fifty years, with the names of the bankrupt businesses.

That our bootleg miners were not the first to suffer from the middleman is proved by its pages, too, for it says in the old days "twenty-five percent of the value of the product was paid to the middleman for passing it through his books . . . five hundred and twenty thousand dollars a year for doing nothing taken out of the pockets of eight or ten men".

Free trade for English coal, mine strikes, terrible mine accidents, depressions, lack of canal boats--the coal-trade reads like a hundred years of headache.

However the coal got mined. There are tables here to show it. The region even thought it was going to mine iron ore, too, at one time. That was the locally famous "black band ore" boom, almost forgotten by other books as well as by those now living in this locality. But Mr. Road's account tells of that excitement in 1835 and gives the State geologist's analysis of samples from the Mt. Laffee, Guinea Hill, Zachariah Run and other mines where the ore was found in the upper Red Ash measures. Hope died hard in the breasts of Benjamin Banman, E. W. McGinnis and Samuel Whitney. Even now, at Wadesville

and Port Carbon, are two openings still known as "the Black Band shafts".

Mr. Roads cites, also, a load of coal long before that of Necho Allen or Colonel Shoemaker. He says he found this on an old loose sheet of paper in the P. & R. C. & I. Company's vault, and mighty interesting reading it makes:

"During 1798-1799 Bartlett or Barblett was sent up the Schuylkill River to inspect timber for spars for the French Navy. On his return to Philadelphia he took with him a load of coal down the river (no mention of quantity)."

Twice in this County's history the great white pines which once reared lofty heads in our valleys have again stood stoutly up to witness to two early but once discredited events in our pioneer history: this first load of coal and the massacre of the Neimans by the Indians in 1780.

This region will long owe grateful thanks to both Mr. and Mrs. Roads and to the P. & R. C. & I. Company archives.

J. Oliver Roads, geologist and research engineer for the P. & R. C. & I. Company for almost fifty years died at his home, 1339 West Market Street, at 9:30 last night after having been ill three weeks. He would have been 75 years old next month.

He was born in New Philadelphia, the son of Mr. & Mrs. Jacob Oliver Roads, his father having been a pioneer coal operator in the Shenandoah area. He was educated at the Stevens Engineering School, Philadelphia, now a branch of the University of Pennsylvania, and upon graduation followed construction and mining engineering in New Mexico, Colorado, and Claifornia.

Returning to this region during the '80's, he married Catherine Matz, of Pottsville, daughter of Sheriff Matz. Soon afterward he entered the employ of the P. & R. C. & I. Co. as a mining engineer.

An accomplished musician he was a member of the Pottsville Symphony orchestra, under the direction of Prof. Frederick Genard, for many years. He played with equal ability a cello, zither, and piano. His maternal great grandfather was a aide to General Washington during the Revolutionary War.

Mr. Roads was a member of the Episcopal Church, the Elks and The Schuylkill County Historical Society. Mild-mannered and genial, he had a host of friends throughout the county. He had been in good health until stricken ill a few weeks ago.

Surviving are his wife, two daughters, Mrs. Robert Garrett, Frackville, and Josephine, at home, a sister, Mrs. Thomas Downing, Pottsville,

Papa always liked to relate stories of the wild
age of the 80's - especially in New Mexico where
he came in contact with the savage Comanche
Indians. Geramino was on the war-path.

A favorite story was how he was always
brought to an old Spanish Mission outside of
Santa Fe. The monks would listen to Papa &
during the quiet night after night in the patio.

Papa met a cowboy in New Mexico in those
early days and the two young men became warm
friends. When Papa returned east, the friendship
ended. The cowboy disappeared. But in the
1930's a Wild West Show visited Patterson. I
can still hear Papa say "I've got just the
man. I'll know you anywhere, Ponder" he said.
Here it was Papa's old friend - the cowboy, now
in the show. He was a ^{performer} stake and still with the
cow riding with the poloists in the east scene
where the Indians attack the stage-coach. The
two old friends spent a wonderful day together. And
Papa went to the train with the friend of his youth
and said "I told you so". They both said, "I did
it all day in this room all day." And a
little incident, isn't it?

INTRODUCTION

In compiling the history of the Coal Trade of Schuylkill County it is not intended to present a literary gem but a simple record in a more or less statistical form, of the rise and fall of this Trade.

With this purpose of preserving records known to exist, records which will finally be lost, especially in regard to location and shipments of operators from the different collieries now long forgotten and entirely unknown to rising generations, the author has carefully perused and studied many documents.

In collecting and interpreting these records of early mining, the author has compiled historical facts and dates from the early engineers' maps and field notes of Allen Fisher, John Hodgkiss, P. M. Sheaffer, Peter Simpson, John Lewis, and from the later engineers - Quilitch, Col. De Saul, General Pleasants, Harris Brothers, Symons, Geary, The Philadelphia and Reading Coal and Iron Company and Girard Estate records, with the additional information quoted from Rodgers State Geological Survey of 1852, and the private records of the writer. Eli Bowen's History of 1843 was largely taken for the legends, Canal and Reading Railroad, which are known to all historians.

In summarizing the Coal Trade Conditions from 1833 to 1852 the author quotes from Carey's "Meditation on the Coal Trade" and from Bordas' articles on the same subject. From 1850, the conditions involved in Coal Trade to the history of the Basis in 1873 are quoted largely from Benjamin Bannan's coal statistics which were accepted by the trade as authentic. In particular the author desires to state his appreciation for the courtesy shown him by Mr.

Arthur Sheaffer who so generously permitted access to the valuable records of his father, the late P.W. Sheaffer.

Shipments from the collieries annexed to each chapter are in a number of cases, incomplete especially in the early reports. These reports are taken principally from coal transported on the Mine Hill and Schuylkill Haven, Mt. Carbon, Mill Creek, Schuylkill valley and Little Schuylkill lateral railroads to the landings at Schuylkill Haven, Mt. Carbon, Fort Carbon and Fort Clinton from 1850 to 1870.

Local sales were not reported until 1893 when they were generally included in the shipments. In some instances where a company or individual operated several collieries, they reported as a total the shipments of their collieries. In the separation of the shipments from these collieries, the shipments were based on independent reports when available at times and applied to the totals. While this may not be strictly correct to the several collieries affected, the totals, however, are fairly reliable. In later years discrepancies may arise in the annual shipments, but these are due to the reports of some companies ending the year on December 1st and others on January 1st.

Jay Cliver Woods

THE COAL REGION OF MONMOUTH COUNTY, PENNSYLVANIA

There was a time when coal was entirely unknown, when this product of the aeons of time lay buried in the depths of the earth, ready to be developed into the world's richest and greatest industry.

The history of the development of coal has been brief, spanning but a few centuries -- which is a short time in the story of the world. Yet the coal trade has reached tremendous proportions, growing from the feeble introductions of the fuel to the many peoples to the gigantic industry, the bulwark of many nations' wealth.

"The earliest record of coal being actually mined for commercial purposes was made in 1259 when King Henry, III, granted the privilege of digging coals to the "good men" of New Castle in the vicinity of that place. The early workings were no doubt of the simplest and rudest kind. During the fourteenth and fifteenth centuries the use of bit coal as fuel gradually increased, especially as there had been a wasteful consumption of wood in the country, so that wood for the purpose of fuel became scarce and expensive.

The use of coal in the cities, however, was at first met by that popular and ignorant prejudice which assails all innovations of the kind upon ancient use.

In the reign of Edward I, the inhabitants of London loudly protested against the growing use of coal; and a proclamation of that monarch in 1306 prohibited the use of coal

in London. In 1649 the City of London petitioned Parliament against the use of coal. Notwithstanding these popular prejudices and royal proclamations, the consumption of coal still increased, and as more convenient modes of burning it in houses were invented, its smoke was greatly abated until by degrees it gradually began to supercede the use of wood.

In 1699, 300,000 tons were exported to London. In 1740 iron works were established at Colebrookdale in Shropshire, in which coke produced from coal was successfully used."

- Rodgers First Geological Survey.

In many parts of the United States, coal was found; and as early as 1670 references were made of coal deposits in letters and documents of the early explorers and settlers. In 1762 William Scull, a surveyor of that time, had extended his surveys beyond the Blue Mountains. His map of 1770 indicated coal deposits at different localities between the Schuylkill River and Swatara Creek in Schuylkill County. One of these surveys was made for Adam Sweigart in the vicinity of Lorberry during 1762, of which a copy of the receipt dated October 29, 1762 for surveying his land, is on record in Fisher's Field Book No. 6 in the vault of the Philadelphia and Reading Coal and Iron Company and which is hereto attached.

"Received the 29th October 1762 of Adam Sweigart the sum of three pounds four shillings for surveying 145 A. 70 Pr. of land over the Blue Mountains in pursuance of a warrant to John Wartz.

5.4

Signed - Wm. Scull

A copy taken from the original receipt May 17, 1837

Sam'l. B. Fisher."

A survey of lands in the vicinity of Mount Carbon, was made on November 8, 1749 "for the use of the Honorable proprietors situate on the Schuylkill River containing 646 acres and allowances. Warrant dated November 25, 1748 and the Patent, March 6, 1814" - Vol. 84 Fishers Note Book,
P & R C & I Company Vault.

During 1798-1799 Bartlett or Earblett was sent up the Schuylkill River to inspect timber for spars for the French Navy. On his return to Philadelphia he took with him a load of coal down the river (no mention of quantity)

- Loose Leaf in P. R. C. & I Co. Vault.

In the year 1775-1776 several ark loads of coal were conveyed down the Susquehanna River from the Wyoming coal fields, and taken to the United States Armory at Carlisle in the manufacturing of fire arms. It was in Wilkes-Barre that Judge Fell in 1808 first used coal as a domestic fuel. The following excerpts of the early history is taken from Eli Bowen's History of 1848:

"In 1778 coal was known to exist in the vicinity of Pottsville and at different times searches had been made; but the coal found was so different from any previously known that it was considered utterly valueless, more especially as no means known could be found to ignite it, and explorations were abandoned for a time. The first account of coal in the Schuylkill Valley was about 1790 when Becho Allen, a noted hunter who lived on the Broad Mountain discovered stone coal at the foot of the mountain about St. Clair.

"Tradition says Allen had camped for the night under the shelter of some overhanging rocks, and having built a fire among

some fallen rocks settled himself to sleep as near it as was safe. During the night when the wood should have burned to embers, leaving the fire low, Allen was surprised to be awakened by more heat about his legs that was comfortable, but he was astonished to find the rocks a gleaming mass of fire.

"Such were the facts as they were generally given by tradition. Several versions of the story were told by the associates of Allen, but they were all substantially the same. In 1795 a blacksmith by the name of Whetstone chanced upon some coal and used it successfully in his shop. His success induced others to dig for coal and when found, attempts to burn it proved a failure."

These failures to ignite what they claimed as coal, were in all probability due to the fact that it was nothing but slate.

Even at this early date, there were some people who believed in the existence of coal in the environs of Pottsville, one of whom was Judge Cooper through whose influence the search for coal was continued under the supervision of Nicholas Allen.

Among the first to explore in the vicinity of Pottsville were the Messrs. Potts who prospected for coal along the Old Sunbury Road, but were not successful and abandoned their search. William Morris, soon after the Messrs. Potts terminated their explorations, became the proprietor of the greater part of the land in the neighborhood of Port Carbon on the Schuylkill River.

"During the year 1800, he discovered coal on his lands, and in the same year took a considerable quantity to Philadelphia. Unfortunately, he was unsuccessful in convincing anyone as to the value of his coal and was forced to sell his lands and abandon his project of making a business of mining coal."

Further explorations for coal in the Schuylkill Valley were abandoned for some time after this failure, and did not revive until 1806 when coal was found by Peter Rittenberg, a tall race for the Valley, large on the Schuylkill River at Pottsville. It was tried in the smithshop by David Berlin, a blacksmith, of the neighborhood, with complete success; (they had stumbled on some good coal) and from that time stone coal grew in repute among the smiths of the Schuylkill Valley, as it had, long before, grown in favor with the blacksmiths of Wyoming and the Susquehanna.

"In 1810 a chemist made an analysis of the coal from this region and was convinced that there were all the properties suitable for combustion. He erected a small furnace in a vacant house on Front Street in Philadelphia to which he applied a strong blast and obtained an immense heat from the coal." This experiment showed proof of its quality as favorable for its introduction as a fuel in the City. Although it might be inferred that this experiment would not fail to secure its favor of the people, yet such was the prejudice against the "rocks", that nobody would become interested. Two years later, in 1812, Colonel George Shoemaker and Nicholas Allen discovered coal on a piece of land which they had recently purchased at a place called Centerville about a mile north of Pottsville. They mined several wagon loads of coal and took it to Pottsville to find a market, but no person could be induced to buy this coal. His partner, Nicholas Allen, became discouraged and sold his interest in the land and mine to his partner, but Colonel Shoemaker having received some slight encouragement from people in Philadelphia continued the mining of coal.

"After mining a considerable quantity he loaded his wagons and proceeded with it to Philadelphia where he had hopes of finding a market, but the experience of the people in that City with stone coal was very unfavorable at that period; the frequent and persistent attempt to impose rocks on them for a fuel had roused their indignation, and Colonel Schoemaker was denounced as a thief and swindler. Colonel Schoemaker persisted, however, and disposed of two loads, one to White and Wazzard, of the Fairmount Rail and Wire Works at the Falls of the Schuylkill and the other to Messrs. Mellon and Bishop of the Delaware County Rolling Mills. The remaining loads were given away or disposed of to blacksmiths and others who promised to try it, but the very men to whom he had given his coal, obtained a writ from the authorities for his arrest as an impostor and swindler. Colonel Schoemaker was forced to beat a hasty retreat and only saved himself from persecution by taking a wide circle around Philadelphia on his return home. In the meantime, Mr. Mellon and some of his men who were anxious to succeed in burning this coal, spent a whole morning in trying to ignite it and raise a heat in one of his furnaces. They raked it, and poked it, and stirred it up, blew it on the surface through the open furnace doors, with great persistency but all to no purpose. Colonel Schoemaker's rocks would not burn and the attempt to create a heat was abandoned. But dinner time had arrived and the discouraged men shut the furnace doors and left. Returning from dinner at the usual time, all hands were astonished at the phenomenon which they beheld. The furnace doors were red hot, and the whole furnace in danger of being melted down with a heat never before experienced. An opinion

the doors, a pleasing mass of white heat was discovered, so that a fire had never been seen in the furnace before. From this time anthracite coal found friends in Philadelphia and the cry "let it alone" became the receipt for its use.

"Messrs. White and Hazard also succeeded, about the same time in using successfully the load of coal obtained from Colonel Shoemaker. The result of these successes in burning anthracite coal, soon gave it a good reputation and removed the prejudice of the people and among the more intelligent persons, its future use as a fuel was placed beyond doubt."

Such were the facts of Colonel Shoemaker's experience in marketing his ten loads of coal, as taken from Eli Bowen's review of the Coal Trade 1843.

John Price Wetherell of Philadelphia, who had invested heavily in the coal lands in the vicinity of Pottsville, became deeply interested in the consumption of coal in the manufacturing centers. About 1820 he made several efforts to use anthracite coal for steam purposes at his Lead Works at Philadelphia but was only partially successful. The first successful use of anthracite coal to be utilized for generating steam was made in 1825 at the Phoenix Iron Works at Phoenixville. The successful adoption of coal for this purpose spread rapidly among the manufacturing cities, and consequently a better market was made for the coal that brought more prosperity to the region. In 1828 Walter Johnson, professor of Mechanics and Natural Philosophy in the Franklin Institute in Philadelphia began experiments on the steam boiler and coal. In his classification of various coals of Lehigh Valley County, according to their heating powers.

The Pottsville (Pioneer) Furnace was the first furnace to
melt iron ore wholly with anthracite coal in commercial quantities.
It was erected and put in blast October 26, 1880, under the direction
of William Lynn assisted by a Mr. Benjamin Lott.

The hearth was tapered night and morning and the yield at each
time was from sixty to sixty-three tons, equal to about three tons
of metal. It was an important fact that in charging the stock
nothing but anthracite coal and iron ore was used. The erection of
this furnace was accomplished through the efforts of Lord Patterson,
Esquire, of Pottsville, who from the earliest history of this re-
gion, has been identified with every measure of its onward progress.
Later in 1884 Mr. Patterson put in blast the St. Clair Furnace after
several years of depression in the region. (Carey Papers)

THE SCHUYLKILL RIVER

It was in 1812 that the forests in the vicinity of Phila-
delphia and adjoining counties slowly began to disappear. Building
timber and cord wood at this time was sold at high rates; and during
the winter season the latter was as high priced as \$16.00 a cord.
The only means by which this timber could be transported were old
turnpike roads; and as business was growing and the population in-
creasing, attention was turned towards the Schuylkill River.
Originally this mode of water transportation was intended to trans-
port the products of the forest and field to market, but it later

capitalists saw the possibilities of better transportation and which they believed had a great future.

By an Act of Assembly on March 1, 1813 the Schuylkill Navigation Company was incorporated. It had no privileges of either mining or trading. Its sole object was a system of canals and slackwater dams for transporting the products of the surrounding country. James McFarland, John Lott, Daniel Graff, George Treiblich and John Mulleney were commissioned in Schuylkill County to raise 1000 shares of stock at \$50.00 each in Orwigsburg.

"The work was started and the first dam was completed with the necessary inlet locks at Mount Carbon in 1817. The following year a freshet swept away the dam and locks. These, however, were rebuilt by an engineer named Conley, with his own plans which later withstood the floods of 1850."

-Hanson's History of 1881.

It cost nearly three million dollars to finally complete the canal which was 103 miles long. In 1819 it was sufficiently completed to permit the descent of several boats loaded with coal. The first landing on the canal was built at Fort Carbon in 1821 by Thomas Ridgway and Clayton Earl on land purchased from Abraham Lott. Tolls amounting to \$230 comprised the receipts for the first season. The shipments were 265 tons in 1819; 365 tons in 1820; 1072 tons in 1821 and 2440 tons in 1822. From this date to 1825 no records of the tolls are available.

On account of the weak construction, the navigation canal was not in a favorable condition for the passage of boats. This was due to the inexperience of the men in canal building or work

probably to the lack of careful engineering construction.

Obstructions of all kinds were to be expected. The most frequent were breaks in the banks of the canal and the failure of the masonry in the locks, due to poor foundations. In enlarging the canal in 1825 the foundations for the northern and southern locks at Harbourside were laid on a sand bottom which gave way in 1830, from the current of springs and canal water passing through the sluices and bottom lining under the floor of the locks. The settling of the masonry required the complete removal of the failing masonry and excavation was sunk deeper to a rock foundation at a cost of \$67,000. The rebuilding of the Harbourside locks was only one of a number that required rebuilding and was a heavy drain on the resources of the Company. The work on the locks naturally increased during the rebuilding of the locks, and the failures in construction not only retarded the progress of the boats but made the business dangerous, uncertain and subjected the Company to great expense for repairs. The dividends to the stockholders were very small. Previous to 1830 a dividend of 1% was declared, but usually there was a loss at the end of the business season. - navigation the ports.

The following amount of coal was shipped to Philadelphia from the mines in the vicinity of Pottsville.

1825	-	6500 tons
1826		16767 "
1827		31360 "
1828		47234 "
1829		79973 "
1830		75150 "

Although the canal was completed in 1825, it was a most primitive. The depth of water was only three feet below the passage of boats or barges with a capacity of 10 to 15 tons. A tow path was provided and the boats were generally pulled along. But even in this primitive transportation, the many delays to boats by ice breaks and repairs required, the passage of boats was extremely limited. Consequently, little attention was paid to it. Under such circumstances the mining of any considerable quantity of coal was not warranted and, therefore, but a small amount of coal was passed through the canal.

In 1825 the amount of coal sent down the Schuylkill was 1800 tons; that of the Lehigh 28,100 tons and of the Susquehanna no account is available. From this year, the Schuylkill coal trade may be dated. That of the Lehigh having commenced five years previously. The canal having been enlarged in 1825, so as to pass boats of 40 to 50 tons capacity, was the beginning of a prosperous business that reached its maximum tonnage in 1842, when the Philadelphia and Reading Railroad entered the field as a competitor to the Schuylkill Navigation Company. The Railroad Company, in order to divert tonnage from the canal to its railroad, reduced the cost of transportation and was making heavy inroads in the canal tonnage. The Navigation Company, aware of the danger of losing a large part of its tonnage, took the necessary steps to again enlarge and improve its facilities of navigation. In 1847 the Navigation Company had reconstructed their entire works. The canal was widened and the depth of water was increased, so as to pass boats of 100 to 150 tons capacity. The number of locks was reduced from 109 to 71, 11 of which were now locks without lift and were usually open except in times of

freights when they were closed to protect the canal. The largest locks were 110 by 18 ft. and the least depth of water in the locks was 5 1/2 ft. and in the canal itself 6 ft. The width was never less than 60 ft.

To facilitate the loading of boats at the seasonal terminus of the company, there were great improvements. At Monticello a new dock 900 ft. long, 60 ft. wide and 6 ft. deep with the rail 17 ft. high above the water, chutes with landings on both sides, was constructed by a Mr. Dunbar and was leased to the Navigation Company. This dock was capable of shipping 250,000 tons of coal during the season. At Fort Carson the Navigation Company constructed extensive landings, enlarging the docks to load six boats at once. The Alto landings and docks consisted of a dock 200 ft. long, 50 ft. wide and 6 ft. deep, the rail elevated 18 ft. above the water with chutes and landings on both sides. This landing was capable of loading 30 boats of 200 tons capacity at one time and was estimated to ship 500,000 tons during the season.

At Mont Carson, the landings and docks were enlarged so as to admit the loading of 6 boats at one time."

-Doven's history of 1848.

To avoid any possibility of a deficiency of water during the dry season, the Navigation Company purchased a tract of land on Silver Creek and constructed a large reservoir that was finished in 1848. This with the addition of the two Tumbling Run dams east of Ft. Carson; the first dam built in 1822 and the second one in 1838, insured a supply of water to operate the canal at all times. The total cost of the canal to 1848 was \$8,700,000.

The growth of the coal trade in the Schuylkill region was very rapid, after the introduction of the Reading Railroad, and increased from 79,973 tons in 1839 to 535,547 tons in 1842. Of this tonnage, the canal shipped 584,692 tons and the first shipment of the Reading Railroad was 250 tons, that rapidly increased to 1,360,681 tons in 1847. By the enlargement of the canal of the same date, its shipments had fallen off to 322,595 tons showing the rapid inroad on the canal tonnage by the railroad, due in a great measure to the excessive tolls on the canal and also the slower movement of coal to market. The competition between the Railroad and Canal continued until 1847 when the Reading Railroad Company, seeing the folly of continuing the competition with the Navigation Company, proposed an amicable arrangement by which the tonnage from the Schuylkill region would be equitably divided to the mutual benefit of both companies. The Railroad company, aware of the importance of the canal and its reconstructed landings, conceded 400,000 tons of coal tonnage for the ensuing year. The Navigation Company rejected this offer and insisted that 600,000 tons be allotted as their share in the tonnage. This not being granted, the negotiations were broken off and each company again made their own arrangements. In 1849 an agreement was entered into between the railroad and canal companies in which the canal was to transport one-third of the coal tonnage, which was estimated for 1849 at 600,000 tons, but the actual amount transported was only 459,205 tons. The tolls were adjusted in 1849 to an average of \$1.70 per ton by the railroad and 75¢ per ton by the canal.

In the 13th and 19th of July, 1850, a severe heat of extraordinary severity deluged the region and was particularly severe in the

valley of the Schuylkill. Property of a vast amount was destroyed, the boat men suffered heavily by loss of boats and the coal operators by the loss of drowned out collieries. The damage to the Schuylkill Navigation Canal was heavy. It was not until the 28th of August that navigation was restored. Only a few days after the resumption of business, on the 2nd of September a second flood descended which destroyed the Schuylkill Navigation for the remainder of the year. The destruction of the canal was increased by the bursting of the Tumbling Run reservoir, which greatly increased the flood volume that swept away bridges and dams in the Schuylkill River. The river in places rose twenty-five feet above its ordinary level, covering the Reading Railroad tracts in places to a depth of three to five feet. These floods damaged the canal to such an extent that the repairs to the canal and the rebuilding of the many dams and bridges, swept away by the flood waters, exhausted their resources and the Company was on the verge of bankruptcy.

At a meeting of the Board of Directors of the Navigation Canal Company, they passed a resolution that, "whereas by reason of the devastating floods the said Company is at present unable to meet its liabilities, and the creditors thereof have petitioned for such Legislation as will justly and equitably protect all creditors for their respective claims" - Navigation Canal Report 1852.

It was several years later before the Company became solvent again. The extension of the Reading railroad's lateral lines into the region and the facilities afforded to the trade by it, forced the Navigation Company in 1859, in order to compete with the Railroad, to furnish its own cars in which to transport over the Reading tracks

the canal from the docks to the canal headhouse. There it was provided the necessary shipping facilities.

Their cars were built under the supervision of the Loading Company and were of the same pattern as their four-wheel cars, but to distinguish them the Navigation cars were painted yellow, while the Loading cars were black. In 1865 the Navigation Company built their cars from their own design but still maintained their yellow color. "In 1869 the Navigation Company delivered by their own cars to the several landings:

258,605 tons at Fort Carbon and Felo Alto

28,527 " " Mt. Carbon

395,235 " " Schuylkill Haven

25,464 " " Port Clinton

694,879 Total number of tons."

-Dannen's position of the Canal Trade.

On May 12, 1870 the Philadelphia and Reading Railroad Company tested the Canal.

The coal dirt washed from the mines and creeks became a constant source of trouble and expense to the Navigation Canal Company in keeping free the canal and docks from its deposits. Finally about 1870 the Port Carbon landing was abandoned for the Felo Alto landing. In 1873 the same cause compelled the abandonment of the Felo Alto landing and the terminus of the canal was moved to Schuylkill Haven.

In 1883 the head of Navigation was moved to Port Clinton.

As the deposit of coal dirt and sand became too expensive to remove from the Blue Mountain Dam, a new landing was created in

1915 one mile above Lanesburg, but it was not completed and was abandoned. Finally one coal was shipped successfully to a vessel lower down the river for the new route constructed at a cost of \$100,000 above the line.

The Union Canal

The Union Canal, designed to connect the waters of the Susquehanna and Schuylkill, was one of the earliest waterway corporations in the State. Construction was commenced in 1820 for a canal from Pine Grove to connect with the Union Canal at Lebanon. The work progressed so quickly along the entire length and was so far completed that on November 30, 1830, more or less tons of coal passed through to Pine Grove to be loaded with coal from the mine at Lanesburg. This was the only development in the Lanesburg District. The coal from these collieries had to be hauled by oxen over the rough primitive roads to the canal at Pine Grove. But in consequence of the expense, Moses Wells, one of the three operators, abandoned the mine. In order to get tonnage for the canal, and also as the landowners were anxious to receive payment from their lands, the Union Railroad was chartered March 3, 1830. This was the first railroad chartered in Schuylkill County and was designated as an outlet for the river system and Lanesburg District. The construction of the Railroad was undertaken by the landowners in the district and was completed with a single track in 1833. From the head of the railroad at the foot of Red Mountain, an incline line

was built to reach the higher elevation at the collieries. Steese and Oliver were operating on a vein in the Red Mountain near the head of the incline plane. They commenced operations before the completion of the railroad, mining their coal and hauling it in wagons to the Union Canal. They sent to market nearly 10,000 tons of coal all of which was hauled over rough wagon roads.

- Testimony of James C. Oliver in Sheriff's
Levy on Donaldson Coal Lands in 1851.

In 1833 the coal taken from the Lorberry mines was 5500 tons that steadily increased to 20,500 tons in 1840.

The Managers of the Union Canal Company report for the year ending November 1830: "That the Canal opened on the 27th of March, 1830 but owing to the state of work on the Schuylkill Navigation Canal, no boats passed upwards until the 11th of April. The amount of cash received for tolls from November 1829 to the 1st of November 1830 was \$55,133.32. The tonnage transported on the canal during the year was 41,094 tons. The great dam constructed in the Swatara Gap is about completed and when full will cover a surface of about 300 acres."

The first boat dispatched through to Philadelphia laden with anthracite coal from the mines of Leh and Hoch in the Swatara District, left Pine Grove December 4, 1830. In order to meet the increasing coal trade the Union Canal was enlarged in 1851 to pass boats of 30 tons capacity. During the year 1850 and additional large reservoir was constructed on the Little Swatara Creek to insure a full supply of water during the dry season. This was considered the largest reservoir in the state at that time. The freshet of 1862 carried away the breast and all the dam along the

canal, and the canal was abandoned and the right of the canal was sold to the Chesapeake and Potomac Railroad Company.

THE CANAL

The opening of the Schuylkill Navigation Canal in 1811 although a very primitive waterway was the beginning of the movement of coal mines in the vicinity of Pottsville. The operators who had been making improvements at their mines in anticipation of the opening of the canal began to ship their coal by oxen teams over almost impassable wagon roads. Among the first was Joseph Belner who shipped a quantity of coal from his mines to his ark at the canal in 1813.

"The first ark loaded with coal was sold in 1813 for \$18 and his second ark for \$19."

-Loeser Paper, Pottsville Library.

As the canal became more improved the quantity of coal shipped increased correspondingly. In 1822 there were mined and shipped 3240 tons. The increase in tonnage from this time required heavier means of transportation than the rough roads then in use. By 1835 the roads had been improved but were not very satisfactory. Another Pott conceived the idea of laying a track from his mines above Fort Carbon to the canal basin and in 1829 he built the railroad which was the first railroad constructed in Schuylkill County. The success of his venture was followed by later railroads leading to the

directions to the mines on main roads. These roads were of a primitive character and only crude conforming more or less to the contour of the ground and the crude conditions.

The second railroad constructed was a short line from the canal basin at Fort Carbon to the mines of William Morris a distance of several miles to his mines above Fort Carbon. But it was apparent that these crude roads were inadequate for the increased business. The canal having been enlarged required better means of transportation from the mines. Incorporated railroads were built and ready for transporting coal on the opening of navigation in the spring of 1831.

The Schuylkill Valley Railroad chartered April 23, 1830 which had been in operation during the greater part of 1830 commenced at Fort Carbon and was located on the west side of the Schuylkill River (now used in part by the State Highway) and terminated at Lancaster, a distance of 10 miles. There were no lateral rail roads intersecting it. The main line cost \$55,000 and the lateral about \$10,000.

The road was completed in 1840 and twenty-one cars of coal were loaded by Aquilla Colton at his mines at Belmont, located about two miles above Fort Carbon, and hauled to the navigation canal landing by three horses. In the year 1840, 19,423 tons of coal were transported over the road. During 1843-44 the road was rebuilt along the eastern side of the Schuylkill River. On July 25, 1851 it was leased to the Philadelphia and Reading Railroad Company for 99 years.

The Mill Creek Railroad was also in operation during 1830, the main road extended from Fort Carbon to the Broad Mountain a distance of four miles, with three lateral roads, and cost \$10,000.

These planes were in continuous operation until abandoned January 1899.

The Mount Carbon Railroad was chartered April 29, 1829, commencing at the Mt. Carbon docks or landing, it extended up through Pottsville to the two branches of the Norwegian Creek, the east branch to Mt. Laffee and the west branch to Wadesville, a total distance of 9 miles with a number of lateral lines under construction during 1831. During 1831, 26,940 tons of coal were shipped over the road. It was rebuilt during 1844 and 1845. The grade and alignment of the road was such as to permit by gravity the loaded cars to descend from the mines to the landings at Mt. Carbon. Mules were employed to haul the cars back to their destination. Each trip descending, carried a car loaded with the mules to haul the return trip to the mines. It was not until 1862 when the first engine was put in service by the Company.

On March 5, 1860 the road was leased to the Philadelphia and Reading Railroad Company for a term of 999 years.

The Little Schuylkill Railroad was chartered with supplement April 14, 1828, to construct a railroad from Port Clinton to Tamaqua, a distance of 22 miles and was completed during 1831. The road was originally intended for locomotive power, and an engine was purchased in Philadelphia for that purpose and hauled to Port Clinton on a wagon that required sixteen head of horses to transport it. The engine proved a failure due to the light construction of the track and after several attempts to use it, it finally ran into the river and was abandoned.

It was not until the track was rebuilt in 1838 that locomotives were adopted. The final cost of the railroad was \$255,000. The road transported 14,000 tons of coal during 1834.

POTTSVILLE AND DANVILLE RAILROAD

The Pottsville and Danville Railroad Company was incorporated under the laws of Pennsylvania April 3, 1826, and the first survey of the line by Moncure Robinson was made under the direction of the Canal Commission of Pennsylvania during the summer of 1827. This original line was revised in a later survey made in 1831 by Moncure Robinson and Francis W. Hawl, Engineers for the Company, and which was adopted at a meeting of the Committee of Managers on October 17, 1831.

The length of line surveyed from Pottsville to Sunbury is a little less than 47 miles; but as it was contemplated to terminate the eastern end of it at the Mount Carbon Railroad 2 1/2 miles north of Pottsville, so much of the road was thus made. From Robinson and Hawl's report of October 1831, "the whole distance from Sunbury Basin to the Mount Carbon Railroad may be completed not merely as a cheap road for horsepower but in a permanent and substantial manner, graded for a double track with a single track and all necessary turnouts laid down, fit for locomotive engines with necessary incline planes, stations, power and all appurtenances."

for the sum of \$675,500, if double track is laid \$148,102 additional or \$823,602.

On the adoption of the report, a meeting of the Board of Directors was called and a few months later when the issuing of stock was authorized and subscribed for, the first installment paid, managers were elected and work commenced.

Under Robinson's plan the planes were so located that the necessary power to operate them was to be supplied from the neighboring streams as a substitute for steam power. The machinery by which it is to effect this being designed and with locomotives operating the levels between them, he claims would insure sufficient power for the greatest trade which can be anticipated."

The road was finally completed to the Mahanoy Valley in 1835 when 4,188 tons of coal were shipped over the completed part of the line to Girardville. During the following year, 1836, 13,347 tons of coal were shipped, and the road abandoned. The grading of the road was partially completed on parts of the line west of Girardville when abandoned. The amount of money subscribed was \$800,000 all of which was expended on its construction. The question of whether the water power as designed for operating the planes was applied and proved a failure is not known, but the legends of the road state that mule power was used. In the construction of the road, due credit must be given to the engineers under whose management the road was built, as the topography of the country through which the road passes is rough and rugged with steep pitching mountain sides and heavy natural rise in the valleys.

At the head of the first plane, ascending from the Mt. Carbon

Railroad at Leesville, a tunnel 1750 ft. in length. The road was driven in deep cuts, was driven and heavy masonry retaining walls were constructed to the second plane at Darkwater, practically a continuous line of fine masonry for a distance of about one mile. This which the Pennsylvania Railroad cut through diagonally, in its construction in 1862, and at that time, after the lapse of years, it was standing intact, without any material defects during the long period of neglect. On reaching the head of the second plane, at Darkwater, the level to the foot of the third plane was along the steep hillside and through two heavy cuts of about 40 ft. in height with retaining wall of masonry at frequent intervals along the hillside cuttings. From the head of the third plane there were no unusual difficulties in construction. The level from the last plane to the head of the Leesville level was simply a long fill, of about 10 ft. high, along low lying surface at Mud Run Creek crossing. The descending plane ran into the Mahanoy Valley, the head of which was in close proximity to the masonry work under the Reading Railroad tracks, near the head of the Mahanoy plane. The subscriptions to the Leesville and Leesville Railroad amounted to \$300,000. The Pennsylvania Legislature loaned and guaranteed \$200,000.

Subscribed	\$20,000
Stephen Girard	200,000
Other parties	<u>250,000</u>
Total	\$30,000

Stephen Girard, besides subscribing to the building of the road, was largely instrumental in furthering the progress of construction by arranging for quick delivery of material and supplies as needed.

SWATARA AND GOOD SPRING RAILROAD

The Swatara and Good Spring Railroad was chartered April 7, 1831. The road extended from the end of the Union Canal Railroad, up the Swatara and Good Spring creeks, to the newly developed mines. On March 25, 1841, its name was changed to the Swatara Railroad. The motive power was originally supplied by horses. By a supplement passed April 6, 1848 the use of locomotive power was authorized and locomotives were placed in service.

In 1865 the road was leased by the Philadelphia and Reading Railroad Company, and later was purchased by them. In 1865 the railroad was extended to Lebanon over the right-of-way of the old abandoned Union Canal, and became the Lebanon and Fremont branch of the Philadelphia and Reading Railroad. The Lebanon and Fremont Railroad extended from its junction with the Lebanon Valley Railroad at Lebanon via Pine Grove, to its terminus at Rockside, being forty-two miles in length.

THE PHILADELPHIA AND READING RAILROAD

The Philadelphia and Reading Railroad was proposed in 1830 and a charter granted in 1831. During the next years, extended surveys were made between Philadelphia and Reading, where it was to connect with the future Schuylkill's proposed extension of their

extended from Fort Clinton to Reading.

In 1845 contracts were made and 11 miles more of road under construction. The original idea was for an outlet for the interior of the region through connections with the Little Schuylkill Railroad. Accordingly, the first charter extended only to the city of Reading, which was 39 miles from the terminus on the Delaware River at Philadelphia, as a charter for the construction of an extension of the Little Schuylkill Railroad from Fort Clinton to Reading had already been granted. Due to the lack of capital, this Company was unable to continue the work on the extension and, therefore, yielded their right and charter to the Reading Railroad Company, who at once had a further extension written into their charter. This which gave them a continuous line of railroad to Pottsville, a distance of 93 miles from Philadelphia.

During the period from 1843 to 1848 the country was plunged into severe depression. Business and industries were at a low ebb. There was very little individual enterprise shown, but in spite of these difficulties, the men who were at the head of the project steadily pursued their course of having the road completed. Everybody as well as financiers was taken to the utmost to insure the quick construction of the road.

Finally, on the first day of January 1848, the efforts of the people were rewarded, by having the first locomotive and train of cars carrying passengers pass over the entire line from Pottsville to Philadelphia. At Pottsville was the terminus of the Reading Road, the short distance to Pottsville being over the St. Louis Railroad. From that date, the business was increased in a degree scarcely

calculated on any similar improvement, would be measured by millions.

"In the year 1870 the Philadelphia and Reading railroad carried 4,551,555 tons of coal; it transported 1,754,000 tons of merchandise; it carried 3,034,000 passengers; its capital at that time being \$41,000,000, and its annual rent account for leased lines of railroads and canals represented \$20,000,000 additional, making \$61,000,000 invested in a business that depends for its prosperity and success upon the carriage of anthracite coal."

-President F.B. Gowen's Argument
Atlantic City, July 29, 1875.

"The road has two continuous tracks of railway extending the whole distance of 98 miles from Mt. Carbon near Pottsville to the Delaware River, three miles above the head of the City of Philadelphia; with branches also laid along the whole track. 1 1/2 miles long connecting at the State House with the principal business streets of the same city, for passenger, merchandise and city coal trade. The rail used is of the H pattern with both top edges alike; and weighs 45 1/8, 52 1/2 and 60 lbs. to the yard; the lightest having been first, and the heaviest last used. The track is laid in the usual manner, the lower base of the rail, being notched into 7 by 9" white oak sills, laid in well-seasoned material 14" d.c. The engine used in 1847 was 40 first class engine weighing 15 tons, 4000 coal cars of 5 ton capacity; 500 freight and 10 passenger cars; 5000 coal and 1000 express cars and 1000 freight and 1000 cars."

-The Pennsylvania Railroad, 1875.

THE SCHUYLKILL AND SUSQUEHANNA RAILROAD

The Schuylkill and Susquehanna Railroad was constructed originally by the Danbain and Susquehanna Coal Company to transport the coal from their mine at Black Spring Gap to the Pennsylvania Canal at Danbain. The road at that time (1844) was 20 1/4 miles in length, and in 1841 was extended to Black Spring Gap.

The Lehigh Railroad and Improvement Company, incorporated in 1840, proposed to construct a railroad from Lehigh Creek Gap to connect with the Danbain and Susquehanna Railroad at Black Spring Gap, a distance of about 7 miles. In 1841 the Danbain and Susquehanna Coal Company purchased the Lehigh Railroad and Improvement Company's lands and in 1842 extended their railroad to Lehigh Gap to give them an outlet to the Philadelphia and Reading Railroad and the Schuylkill Navigation Canal.

On March 1, 1869 the Danbain and Susquehanna Coal Company was sold at a bankrupt sale, and on April 1, 1869, was purchased by a corporation under the name of the Schuylkill and Susquehanna Railroad Company, which operated the railroad to May 29, 1872, when the Philadelphia and Reading Railroad Company came in and decided to purchase the stock. It was then merged with the Philadelphia and Reading Railroad system.

THE PHILADELPHIA AND READING RAILROAD

The operators who sold their coal over the Schuylkill Valley and Mill Creek Railroads became dissatisfied with the excessive tolls charged by the Philadelphia and Reading Company, and the canal was the only means of getting their coal to market, and

and it is not its advantage to be used as such.

At a meeting to these companies, it was decided to charter a railroad connecting the Little Rock and Fort Smith with the existing railroad at Ft. Smith, a distance of about ten miles. This would give the shortest route from Ft. Smith to either Ft. Smith or Dallas.

The road was chartered July 10, 1894, and the first train of cars passed over the road in November, 1894. The road was sold to the Philadelphia and Reading Company on Jan 1, 1900.

The original directors of the road were:

<u>Philadelphia</u>	<u>Lehigh</u>	<u>Reading</u>
John Price Matherell	Samuel Bell	W.C. Palmer
James H. Clewinger	Geo. W. Leach	John H. Hensley
Benjamin Springer	Dr. Luther	John H. Hensley
Henry Carey		Ward Patterson
		Charles H. Hensley

Many of whom were operating collieries in the Ft. Smith and Fort Carbon territory.

West Reading Railroad

Incorporated April 11, 1894, to connect a railroad from the terminus of the Little Rock and Fort Smith Railroad to connect with the Reading Valley Railroad, but was not to exceed 25 miles in length. Work was delayed on this line and on Oct 11, 1894, was incorporated as the Lehigh Valley Railroad. The Little Rock and Fort Smith Railroad was sold and on April 11, in the same year, transferred the line for commercial construction to five years. It was then transferred to the Lehigh Valley Railroad. The construction was completed

in 1891. In 1891 it was leased to the Chesapeake and Potomac
 first railroad of coal through the tunnel in 1891. . . . At that
 time, on January 1, 1893. Later it was chartered to connect
 with the Potomac Valley Railroad, and it was leased to the
 Little Schuylkill Railroad Company. The Little Schuylkill, Potomac
 and Broad Mountain, and Little Schuylkill Railroads were finally leased
 to the Philadelphia and Reading Railroad.

The Mountain Line Railroad was located between the end of the
 Schuylkill Valley Railroad at Pottersville and the Little Schuylkill
 at the foot of the mountain, a distance of about four miles, over which
 passengers passed in stages for many years. The railroad was built
 over this route by reason of necessity on the part of the two companies.
 When the Philadelphia and Reading Railroad Company acquired con-
 trol of both these roads, they constructed and put in operation the
 Railroad across this route in 1894 and 1895.

The 1895 and Potomac Railroad was chartered April 22, 1894, to con-
 struct, in connection with the Severn River Railroad, a railroad
 up the Potomac Valley and thence to connect with the Chesapeake Rail-
 road in the town of Pottersville. A supplement, approved March 22, 1895,
 authorized the extension easterly of this road to the foot of
 the Schuylkill Break and down the Schuylkill Creek as far as may be
 deemed expedient; with authority to make connections with the rail-
 road in the Valley.

Under this charter and supplement the Little Schuylkill and Potomac
 Railroad was built and completed in 1895. It was chartered in 1894. In

1866 it was merged with the Lehigh Valley Railroad, by which it has since been owned and operated.

Mahanoy and Broad Mountain Railroad

The charter for the road was granted March 29, 1859. The road was built for an outlet to market for that portion of the Mahanoy Valley between the terminus of the Mine Hill and Schuylkill Haven Railroad at Big Mine Run, and the Little Schuylkill Railroad at the eastern end of the Valley, by way of a plane 2600 ft. in length from the Mahanoy Valley to the top of Broad Mountain, at the town of Frackville. It connected with the Mill Creek Railroad at St. Clair. The road and plane with powerful machinery to hoist the cars to the top of Broad Mountain was completed and the first shipment of coal from Connor and Company's colliery passed over the road May 30, 1862.

MINING

The few early mining operations during the period from Colonel George Shoemaker's initial sale of coal in 1812 had increased to thirty-seven in 1829, all of which were mined by drifts. Among the first operations to enter the coal mining business was the Tuscarora Mining Company chartered April 6, 1814, which was financed for a large business. After opening several drifts with no available means to market their coal it was abandoned for the present. But

1800, 1810, and 1820. The first mine was opened by William Harrison
was in continuous operation for 20 years before being abandoned.
In the year 1814, Dr. Harrison opened a mine at Leesville
and the following of the celebrated John and William. In
1815 James Harrison commenced mining at the Delaware mine a short
distance north of Leesville. The coal mined was carried to the
Schuylkill River, where it was sold, including the cost, for
\$1.25. William Harrison in the same year began mining on Mill Creek
near Fort Carbon. Taylor's mine at Leesville was opened
in 1818 by Jacob Taylor. Gravel and sand, the original operators later
became the prominent North America Coal Company, which was
in 1822. It was in 1825 that the business of mining got its impetus.
During this year the North America Coal Company began its operations
on an extended scale. Other operators started during 1825 were
George Leber at Tuscarora
Eliott Wallace & Company at Cumbola and Tuscarora
Nichols and Moore at Cumbola
Curry and Bolton at Belmont
Warner and Wade on East Correction Creek at Leesville
Lotts and Bolton at Fort Carbon (opened three drifts)
Clark and Hull at St. Clair
Farvins at St. Clair by Francis Nichols.

The introduction of railways into the district, by which the coal
was drawn by horses, gave a new impulse to the industry which greatly
added to the efficiency of coal operation. In 1850 the amount of coal
shipped was about 17,000 tons and in 1857 21,000 tons. In 1860,
and by the year 1870, it had increased to 27,000 tons.

the coal trade began to assume an imposing attitude.

During the period from 1825 to 1830 mining was further developed and placed on a more substantial basis, as the investors of capital became more interested in mining possibilities. In 1826 Patterson and Hubley opened a mine at Centreville, a short distance north of Pottsville. In the same year the famous Rain Bow Mine was opened at St. Clair by Ulrich and Schrader, as was also the Flowery Field by John Philips at Wadesville.

In 1826 Frederick Hass began mining, being the original operator of the Eagle Colliery at St. Clair, now operated by the St. Clair Coal Company. Snyder's Mill Creek Colliery was originally opened by Neil Crosly during the same year, as was also the Chamberlain Colliery by J. & R. Young at Port Carbon. Ravensdale, east of St. Clair, was worked by Brooke and Potts in 1827, followed by the Hickory Colliery by Beck and Woodside and the Sillyman tunnel by J. P. Wetherell in 1828, both of St. Clair.

The Centerville mines of Kay, White and Comb, situated a short distance north of the City of Pottsville, was opened in 1827. The Greenwood mine, on Coal Street, originally opened in 1828 by Luckley. Gideon Bast's Black Valley mine, north of Minersville, was opened in 1828, as was also the Silverton Black Mine, south of Llewellyn, by David Llewellyn. During 1829 the Phoenix Park Tunnel was driven by Wheeler and Meritt and the old North Mine by Miller and Rex, both mines at Phoenix Park, west of Minersville. Milnes and Spencer, north of Fishbach, and Ball's Mine, operated by Thomas S. Williams, both of which were opened in 1829. Ball's gangway was connected with the Young Brothers' gangway at Port Carbon and under the operation of the succeeding operators had the distinction of

shipping the coal either at Port Carbon or Pottsville. Pinkerton's tunnel at St. Clair opened by West, Hudson and Pinkerton in 1830; the Palmer Colliery at New Philadelphia by Volney Palmer and the Buckville Colliery at Tuscarora by Blight, Wallace and Lweing all opened in 1830.

The Salem mines, between Pottsville and Port Carbon, were opened by the Young Brothers. Later that was known as the Salem or Young's Landing, it was operated by Milnes and Haywood, who shipped their coal direct from the breaker into the canal boats. Wagner's Tunnel at Minersville was driven by the Diamond Coal Company. The East Pine Knot by John Offerman, the McGinnis Hollow drift in the Heckscherville Valley were both opened in 1830. The Oak Hill Mines at Mt. Laffee were opened by Daddow and Brown in 1830.

The collieries prior to 1830 were all in a flourishing condition and were operated in such an economical manner that revenues were derived from the investments. But rumors of fortunes being made in the coal region attracted speculators from the large cities who flooded the region around Pottsville with their speculations in land. These lands were purchased in large tracts by companies formed for the purpose; and these, as well as many tracts held by single individuals, were leased at exorbitant rates to tenants. These joint Stock Companies, or those composed of citizens of other states, obtained charters for mining coal from Legislatures of their respective states. Others became interested in mining operations and the market was over-supplied with coal. The day of speculation came to an end about 1831, after destroying the market that had been so laboriously built up, and every operator of a mine had become bankrupt. The coal trade had only partially recovered in 1833.

from the speculations of the previous years, but notwithstanding, the depression due to speculation and overproduction, new mines were opened on a firmer basis, as the increased demand for coal continued.

A synopsis of the wild speculation during the prosperous times of 1829 and 1830 is taken from Eli Bowen's History of 1848:

"In the year 1829 rumors of fortunes made overnight came whispering down the Schuylkill and penetrated the City of Philadelphia. The young and old were smitten with the desire to suddenly get rich. They thought they had merely to go and play the game boldly to secure their utmost desire. Rumors declared that men worth millions made in a few months, although they had no money to begin with, were quite numerous.

"The road up the Schuylkill Valley was well traveled with these adventurers, the stage coaches were filled, men on horseback and men traveling on foot, all on their way to Pottsville. One branch of these adventurers took up land speculations and another the slower process of mining. With the first, mountains, rocks and valleys changed hands rapidly. The frenzy of speculation was rampant, land that was worth hundreds in the morning, sold for thousands in the evening - in paper money of that description known among the facetious as slow notes. Days and nights were consumed in surveys and chaffering, there was not a man who did not speak like a Croesus.

"The tracts of land passing through so many hands became subdivided and that brought on another act in the drama of speculation; the building of towns and selling of town lots.

"Every speculator had his town laid out, they were to be sure, located in the pathless forests; but the future Broadway and Fall

A short time ago the canal was in use until about 1885 when the Louisville and Nashville Council decided not to remove his tracks from the canal as it was interfering with traffic. Mr. Potts protested against the measures and said, "It's the only outlet from the canal". But of no avail, he was told to take up his track on the ground below, and charge him for the labor.

The Mt. Carbon Railroad paralleled Market Street and Hill intervening. Mr. Potts conceived the idea of sinking a new slope west of his present slope and driving a short tunnel through the hill, then building a new breaker in the Valley of the Mt. Carbon Railroad. Thereby, he could ship directly on the Mt. Carbon Railroad, all of which was successfully accomplished. After a short time in operation in 1857 the breaker was destroyed by fire and forced Mr. Potts into bankruptcy.

The Guinea Hill Mine originally shipped over their own tracks from Fourth and Arch Street connecting with the York Lane track at the canal landing, but later, when the slope was sunk, a breaker was built at about Laurel and Third Street. This track from the breaker connected with the York Lane track at Third and Market Street, delivering its coal at the York Lane Landing. The late mine, corner of Center and Nichols Street, shipped direct to Mt. Carbon docks over the Mt. Carbon Railroad. The Louisville and Nashville Colliery, originally shipped directly into the canal boats at the mouth of their drift. The Sharp Mountain Colliery operated by Henry Morris and the Sale Colliery at Town's Landing also shipped directly into the canal boats. The York Carbon Colliery shipped direct to their dock on the canal.

opened in 1839 with Steam Engines:

- George Potts, Pottsville, York Farm Colliery
- Potts and Langan, Pottsville, Guinea Hill Colliery
- Samuel Lewis, Pottsville, Greenwood Colliery
- Milnes and Raymond, Pottsville, Cedar Colliery
- Charles Elliot, Port Carbon, Port Carbon Colliery
- Francis Nicholas, Belmont Colliery
- William Wallace, " "
- John Stanton, Westwood Colliery, Pottsville
- North America, R, between Pottsville and St. Clair
- Delaware Coal Co., S, North of Pottsville

Railroads of Schuylkill County

	<u>Chartered</u>	<u>Opened</u>
Union Canal & C.	1826	1830
Little Schuylkill	1828	1832
Pine Hill	1828	1831
Schuylkill Valley	1828	1830
Mill Creek	1828	1829
Mt. Carbon	1829	1830
Catawissa	1831	1840
Swatara and Good Spring	1831	1840
Mt. Carbon and Port Carbon	1842	1844
Schuylkill and Pottsville	1844	1855
East Pottsville	1854	1853
Lehigh and Pottsville	1857	1860

	<u>Completed</u>	<u>Opened</u>
Kahenoy and Broad Mountain	1859	1862
Broad Mountain Link	1864	1868
Peoples' Railway	1866	1872

In January 1881, the Coal Miner Association of Schuylkill County was formed. It was composed exclusively of mine operators and those immediately connected in the mining affairs of this region. Upon its organization, Carl Matterson was elected president; and John C. Offerman, Vice President. Samuel Lewis was elected treasurer and Andrew Russell and Charles Lawton, Secretaries. The Board of Trade was composed of W. H. Stringer operating at Pineriville, Samuel Brooke, operating at Mill Creek, Samuel Lotis operating at Belmont, Frank Buckley operating at Pottsville, James A. White, Thomas C. Gidway and Martin Weaver, the latter operating at Pineriville. The officers were elected annually and it was the duty of the Committee on Trade to report annually, to the Association, the State and future prospects of the coal trade.

This was regularly done until its disbandment in 1947.

Iron Works in the Southern Coal Field

As development in the coal trade increased and the winding drifts then opened having reached their lower levels, it became necessary to sink slopes and shafts to lower levels. This necessitated machinery for hoisting the coal and hauling the water to the surface. The machinery for this purpose was furnished entirely by the Iron Works in Schuylkill County; of which the following is a list:

locations, names of proprietors and proprietors of machinery:

Machinery, Iron and Boiler Works

The iron manufacturing industry, boiler, etc. in Montgomery County, were well known throughout the State for the high class of work produced, traced from its earliest history to the present time and days even of high repute.

All machinery has been shipped to all parts of the State and in some cases to foreign parts. The original firm with the name of creation and location are listed below:

Snyder Iron Works, Benjamin Haywood & Geo. Snyder	Rockville	1877
Rockville Iron Works, William Schaeffer & Brother	Rockville	1881
Fort Carson Machine Works, Louis A. Winterstein	Fort Carson	1882
Frederick Machine and Boiler Works, F. Schultz and Brothers	Frederick	1880
Franklin Iron Works, Alfred Brock and Company	Fort Carson	1882
Rockville Machine and Foundry, A. J. Schaeffer	Rockville	1884
Frederick Machine and Boiler Works, Wilson Smith and Taylor	Frederick	1887
Frederick Machine and Boiler Works, John Gott	Rockville	1888
Frederick Boiler Works, John and James Gott	Rockville	1887
Frederick Iron Works, Charles, John & James Gott	Rockville	1887
Frederick Iron Works, The Gotts, A. J. Schaeffer and Brother	Frederick	1887

Boiler Shop, James & John Smith and Co. Craftsmen	Pottsville	1884
Machine Shop, Cuthers, Griffiths & Company	Pottsville	1887
Grain Groves Machine & Boiler Works, J. L. Groves & J. L. Hartman	Grain Groves	1887
Grant Iron Works, Thomas Grant & Company	Grain City	1888
Cuthers Machinery and Machine Shop, John Cuthers	Grain City	1888
The Pottsville Spike & Bolt Works, Schum and Rosenberg	Pottsville	1878
I. & N. C. & I. Company Repair Shops	Pottsville	1879

Ryder Iron Works.

These works were erected by Benjamin Rywood and George Snyder in 1885 and continued under this firm until 1889 when Benjamin Rywood resigned, to be succeeded by Benjamin Wilner, when the works were continued under the name of Wilner and Snyder until 1894. After Benjamin Rywood's improvements, it was continued by George W. Snyder until 1902, when the Pottsville and Reading Steel and Iron Company came into operation. The first hoisting engine was made for the Pottsville and the York and Colliery at Pottsville, the shaft at least being 241 ft. deep. The success of this engine established a reputation for the firm and was followed by a large and increasing business.

During 1893, the firm built 12 steam engines equalling all the Rywood and Snyder prior to 1889. They furnished the machinery for the extensive railroad mills at Pottsville, Conville and Smith's station, also for the Iron Works at Reading, Harrisburg, Columbia and so far

at Mexico.

The large Cornish condensing engine, for the pumping shaft at
Mexico, was the largest pump in the country at that time. It had
a 36" x 12" cylinder with a 12 ft. stroke and ran at 30 rpm.

Another large pumping plant was erected for the Street Improve-
ment Company during 1866 and 1867, at Hayes shaft at Rockville.
Other pumping plants of smaller dimensions, however, were for the
Shawston shaft in 1866 and Otto shaft later. The equipment for the
pumping plant at the Pottsville shaft built in 1874 was considered
by mining men the most complete at any colliery in the country.

"In the extent of output as well as in character of work, the
works ranked third in the state. The plant employed were the Mass
Mill Iron Works at Philadelphia and the Port Pitt Iron Works at
Pittsburgh. During the year 1867 the Snyder Iron Works consumed:
1132 tons of cast iron
151 tons of bar iron
35 tons of boiler iron
They built 223 coal cars
They cast 1210 car wheels
They consumed 507,000 ft. of lumber in car building".

- Eli Bowen's History.

Snyder Iron Works

Erected by William Snyder and another at Snyder in 1844,
who carried on the business to 1864, when Bentley and Fox took over
the works and continued the business to 1878 when abandoned. The
Snyder Iron Works were noted for the high class of workmanship
in all the mechanical processes. Under the management of Bentley and
Fox.

several years of the collieries of the present section were built at their expense, and notably the heavy hoisting machinery for the No. 1000 Colliery. They also built the machinery for the No. 1000, St. Louis and Deer River Collieries, and the machinery for the No. 1000 Colliery Deer River Coal Company. Under the management of machinery and for the machinery for the Atkins Colliery Co. and the Linersville Colliery were built and erected, some of the collieries holding 50 tons.

Fort Carson Machine Works

Erected by Tobias Interstein at Fort Carson during 1889 and continued the building of colliery machinery until about 1899 when he closed the business and retired from active work. The Fort Carson machine shops were among the pioneer works to build a large part of the hoisting machinery and boilers for the early collieries in the Deer Hill Valley, among which were the Robertson Colliery at St. Clair, the Silver Creek, Windy Harbor and Wilmington Collieries.

Interstein, Engine and Boiler Works

Erected by F. Interstein and brother at Trenton in 1890, continuing in the business until 1910, when the firm name was changed to include Mr. Lantz and became a partner and the works were operated under the name of Interstein, Lantz and Company until 1927 when the works were purchased by Fair, Alanson and Company in 1927, who operated the works for a short time. In 1932 P.M. and A.M. Interstein came into the firm; building the machinery for the No. 1000 Colliery, Lorain Colliery. Interstein died in 1962 and the two Intersteins were Mr. Lantz, and it was not an accident that the firm was

was formed with George Carson and George was responsible for
under the firm of McMillin Carson and Company until 1864. The com-
pany was then purchased by J. S. Loomis, William Loomis and William
Smith who continued the business to 1868 when Mr. Smith retired from
the firm and Loomis and Son operated the works until closed by fi-
nancial troubles about 1870. There was a total of 60 engines equal
to 1735 HP built at these works under the management of J. S. McMillin.

The old Loomis Machinery Shop and Foundry was part of the Phila-
delphia and Reading Coal and Iron Company's purchases, the shop re-
pairs shops established in 1878.

Manassas Engine and Boiler Works

Directed at Manassas by Wilson, Smith and Taylor in 1847 who
were succeeded by Carter and Allen in 1852. They established a
name for their machinery that stands today as the name of perfec-
tion. The business was carried on under the firm of Carter and Allen
until 1878 when the shops were destroyed by fire. Carter retired
from the partnership in 1875 and a Mr. Shoener succeeded as a part-
ner and operated the works under the name of Shoener and Allen to
1880 when the firm was again changed to Carter Allen and Company who
continued the enterprise to its abandonment in 1881.

Carter and Allen furnished the machinery for most of the
collieries on the Little Schuylkill Railroad property.

Orchard Engine and Boiler Works

Directed in Pottsville, corner of Washington and Coal Streets
by John Pott in 1848 was continued the sole proprietor to 1887
when the firm of Pott and Vartine conducted the shops until about

176. These works were also collected for the same purpose. Some of the heavy machinery built at these shops was used for the same purpose. Some of the machinery built at these shops was used for the same purpose.

Wheeler Coal Works

Located on the "Island" on the corner of 10th Street and Coal Street by John and Jane Noble in 1853 but later removed to Coal Street. In 1857 James Noble retired and was succeeded by John Noble when on retiring from the firm in 1867 Mr. Noble took in partnership Matthew Rhode and continued the business under the firm of Noble and Rhode to about 1872 when the works were abandoned.

Washington Iron Works

Located on Coal Street in Pottsville by Thomas, John and James Iron in 1852. In 1852 John Iron having resigned, the business was carried on by Thomas and James Iron until 1858. Thomas Iron dropping out of the firm at this time, later James Iron continued as proprietor until falling in bankruptcy when later the property was purchased and the property. The Washington Iron Works was one of the most prominent machine and boiler works in the region. These works supplied the machinery for a large number of prominent coal companies, amongst which were the Preston Lee Vermont Company, the Erie and Ohio Coal Company at Mount Vernon, the Pennsylvania Coal Company and others. During the Civil War, the Washington Iron Works furnished the casting for heavy ordnance for the Government. The mill and erected the machinery for the same for rolling iron.

Reading Iron Works and Coal Shop

Located in 1852 by L.F. ... brother, ... In 1861

Some time before this event, Ward Robertson, chemist, Nicholas Biddle, chemist and others interested in the coal business, had ordered a region of 1000 tons of coal to be used in the first blast of the furnace in blast for three months. Others had succeeded before, in using small quantities of iron using anthracite coal as fuel, but Mr. Lyman was the first person who succeeded in making large quantities. This interesting event was celebrated at the St. Carson house, by a dinner given to those of the County interested in the future of coal and iron. Eighty persons were present. Among them were Nicholas Biddle, Ward Robertson, J.N. Anderson, Andrew Russell and other well known citizens. At the banquet Nicholas Biddle gave the following well known toast: "Old Pennsylvania, her sons live her soil - a rough outside, but solid steel within; plenty of coal to warm her friends - plenty of iron to cool her enemies".

The furnace at which Mr. Lyman succeeded in his anthracite experiment was built on the site of the old furnace and tower of 1837 that later came into the possession of Rogers. Abner Crockett and was almost in its original shape in 1853 when it was enlarged. In 1868 a second furnace was built and a third built in 1878. Woodward and Snyder of Gettysville built the machinery for Mr. Lyman and also for the No. 1 and No. 2 Pioneer furnaces. The machinery for the No. 3 furnace was built by Gately and Fox of Gettysville.

The story of anthracite coal used in smelting iron ore, dates back to 1828 when R. James Beaumont Wilson of Glasgow took out a patent for the use of heated air instead of the cold blast used alone until then, had been used for indirect combustion in the blast

furnaces. Although it is reserved to be called a direct-veer rather than an invention there is no reason to believe that the man of right and idea of the value of his invention and the profit involved it was destined to direct upon the smelting of iron.

The following are extracts from an address by A. A. Brewster, treasurer of the Sterling Iron and Steel Company, delivered before the American Institute in New York:

"The people of the United States have especial reason to hold Mr. Neilson in grateful remembrance for, without hot blast it would be almost impossible to smelt iron with anthracite coal, the experiment of doing so with cold blast having been thoroughly and carefully but unsuccessfully tried in the United States, in France and in Great Britain. The earliest recorded trials having been made in 1790 near Dutch Creek, Pa. and next in France in 1827; but it was only after aided by hot blast that Mr. Orane in 1836 with ovens built by Mr. Neilson himself, finally achieved success with this kind of coals in 1837. Again at Dutch Creek, in January 1838, this time with hot blast, and it is asserted, without a knowledge of Mr. Orane's success, an attempt was made to employ the reverse-veer anthracite, and a blast of five veers is claimed to have been perfectly successful, the furnace being owned by Brown, Britton and Fish. They began from west of ore in January 1838 and after some bad luck with the furnace, began over in the following July, and continued in blast till November of the same year, having produced the first iron pig.

"The Pioneer Furnace at Pittsburg was the second furnace successfully employing anthracite coal, and the same year it was occupied by an anthracite furnace owned by Messrs. Brown, Britton and Fish.

From the early days of the iron industry in the West, the
quality of the iron ore was a matter of great importance. In
the early days of the iron industry in the West, the quality of
the iron ore was a matter of great importance. In the early days
of the iron industry in the West, the quality of the iron ore was
a matter of great importance. In the early days of the iron
industry in the West, the quality of the iron ore was a matter of
great importance. In the early days of the iron industry in the
West, the quality of the iron ore was a matter of great importance.

The primal development of the use of anthracite coal applied
to blast furnaces must be credited to Mr. Crane of Wales whose ex-
periments were so successful. The Pioneer furnace was built ex-
actly for testing the Welsh experiment with Pittsfield anthracite.
It is said that 18 years earlier in 1843 a small furnace the size
below which Crane made iron successfully with Pittsfield coal.

About 1835 iron ore was discovered in certain veins of coal
in the Schuylkill region, that created quite an excitement in the
mining community; and great were the expectations for the future
possibilities in mining this ore. Professor Rogers of the State
Geological Survey in his fourth annual report to the Legislature
of Pennsylvania states specimens taken from different coal veins
analysed under his directions yielded 27 to 39% in richness of the
ore.

Analysis of Iron Ores of Formation III

Seven fine samples taken from the Schuylkill region;
iron ore crystalline carbonate,

Composition in 100 parts		Iron Ore from St. Lawrence	
Carbonate of iron	48.33	Carbonate of iron	48.10
Carbonate of manganese	3.34	Carbonate of manganese	1.00
Per oxide of iron	21.33	Carbonate of lime	7.00
Alumina	1.00	Carbonate of lime	8.00
Silica & insoluble matter	7.00	Silica & insoluble matter	8.00
		Small bits of iron	0.00

Water	8.00
	<u>100.00</u>
Percent of metallic iron	64.20

Water	8.00
Loss	0.15
	<u>100.00</u>

cider contains 6.15 metallic iron.

Iron Ore From same locality as preceding:

Carbonate of iron	66.67
Per oxide of iron	0.55
Carbonate of manganese	Trace
Carbonate of lime	0.15
Alumina	2.95
Silica & insoluble matter	12.90
Water	4.10
Loss	0.78
	<u>100.00</u>

This specimen contains 68.00 percent metallic iron

Iron Ore From Mt. Laffee Mine, Pottsville

Composition in 100 parts:

Carbonate of iron	69.54
Per oxide of iron	14.37
Carbonate of manganese	0.50
Lime and magnesia	Trace
Alumina	0.50
Silica and insoluble matter	40.00
Water	4.00
Loss	0.09
	<u>100.00</u>

Specimen contains 68.52 per cent metallic iron

Iron Ore From Zacherich Run:

Carbonate of iron	68.10
Per oxide of iron	0.10
Carbonate of manganese	0.30
Carbonate of lime	0.05

Iron Ore From Mt. Laffee - another bed:

Carbonate of iron	69.31
Per oxide of iron	14.37
Lime and magnesia	0.30
Carbonate of manganese	0.30
Alumina	0.50
Water	4.00
Loss	0.30
Silica & insoluble mat.	47.00
	<u>100.00</u>

This specimen contains 67.58 percent metallic iron

Iron Ore From Zacherich Run, Pottsville

Carbonate of iron	61.07
Per oxide of iron	14.37
Carbonate of manganese	1.10
Carbonate of magnesia	0.30
Alumina	1.00
Silica and insoluble	14.20
Water	8.00
Loss	0.31
	<u>100.00</u>

Specimen contains 68.5 per cent metallic iron

Iron Ore From Zacherich Run, Pottsville:

Carbonate of iron	68.00
Per oxide of iron	14.37
Carbonate of manganese	0.30
Silica & insoluble mat.	17.03

Carbonate of iron	45.79
Alumina	0.01
Silice and insoluble matter	1.00
	<u>100.00</u>

Water	0.00
	<u>100.00</u>

Specimen contains 41.00 percent metallic iron

Specimen contains 37.14 percent metallic iron

Iron Ore from Wolf Farm
Rabbit Hole Vein, Pottsville:

Iron Ore from Wolf Farm:

Carbonate of iron	45.00
Fer Oxide of iron	15.00
Carbonate of manganese	5.00
Carbonate of manganese	3.11
Carbonate of lime	3.11
Alumina	1.00
Carbonaceous matter	1.00
Silice and insoluble matter	0.25
Water	3.00
	<u>100.00</u>

Fer Oxide of iron	15.00
Oxide of manganese	1.00
Alumina	Trace
Silice and insoluble matter	0.01
Water	3.00
	<u>100.00</u>

Per cent of metallic iron -
37.14

Specimen contains 38.35 percent metallic iron

Explorations were undertaken to discover larger quantities of this ore then known as Black Sand Iron ore. Veins from 1 to 20 inches in thickness were found in the upper bedded masses. The ore was said to be rich and in abundance, while the coal was of a superior quality and the future was favorable to increasing the productivity of the Schuylkill region. Inducements of the most favorable character for investments of capital in the iron and coal business were made; and the supposed inexhaustible supply of coal and iron was an important advantage in the comparative limited capital to carry on iron works. Furnaces were erected to use this ore, and with coal procured at what it was said to be a profitable undertaking. The Mr. Blair furnace was the first to be erected on Wolf Farm. Another, for the purpose of using the ore of the Schuylkill coal measures, in

Section is the lower bed and contains the small pieces of iron ore in
the thickness, but it is found in the most barren section of the coal
bed in which the coal has been developed to the great extent.

The black sand ore of the lower section is composed of
large pieces, and are generally found in layers of iron ore, too
thin and of low grade, to mine economically.

On November 24, 1890 Mr. Daniel Smith applied for a lease on
the Valley Furnace lands to mine black sand iron ore. He developed
a vein of three to three and a half feet thick. The ore of course
yielded 15 percent of iron but was not in sufficient quantity for
commercial purposes and was abandoned.

There may be a few isolated cases where the ore lays close to
the coal vein which would admit of mining the ore in conjunction with
the coal, but this condition is exceptional and unfortunately not in
sufficient quantities for commercial purposes.

If the fact could be established that the black sand ore ex-
tended throughout the region and in quantities of no less than, it would
have been an important section to the coal fields and would have given
additional employment to many miners of coal and iron ore, as well
as employees of furnaces of the region. But the failure of discover-
ing large quantities of ore did not deter the erection of furnaces and
rolling mills in Schuylkill County, as the following list will show
the faith invested had in the Schuylkill region.

Rolling Mills

W. W. Arnold's mill on Little Schuylkill River	1812
W. T. Vernon's mill on Little Schuylkill River erected by George Wacht and Daniel Greer Abandoned	1816 1821

Fair Grove Mill on Little Schuylkill River
 Erected by Albert Boardman
 1810
 1810
 The forge was erected to manufacture cutlery
 and was successful on that. Its main-
 tenance was due to being in the line of commerce on
 of the Union Canal.

Mill on Little Schuylkill River
 Erected in 1829 and later changed to rolling
 mills in 1840

Mill on Little Schuylkill River 1830

St. Vernon Forge, on Little Schuylkill River 1831

Fort Clinton Forge on Little Schuylkill River 1855

Fort Clinton Forge erected by George ^{EG} in 1855 and changed to
 rolling mill by Calvin Bertolotto about 1859 and sold it a short
 time when sold to Robert Inness who continued the business to about
 1867 when the mill was sold by the sheriff.

INDUSTRIES IN SCHUYLKILL COUNTY

Valley Furnace at New Philadelphia
 Erected by F. W. Geisenheimer and Company
 a charcoal furnace
 1835
 Rebuilt to use bituminous coal
 1838
 Sold to R. H. and J. H. Johnson
 1848
 Abandoned about 1850

Jefferson Furnace at Auburn
 Erected as a charcoal furnace in 1840 by John Gott;
 Geo. H. Gott, Schuylkill Co.
 Rebuilt at Jefferson Station by John C. Emerson and Bro. 1879

New Lindeburg Furnace on Little Schuylkill River
 New Lindeburg Forge erected
 1843
 Rebuilt as a blast furnace by J. H. and J. H. Gott
 for a new method of making steel
 1877
 Abandoned - 1879
 Rebuilt as a furnace by J. H. Gott,
 Jacob Gottschalk and Joseph Gott
 put in blast, 1897

The following table shows the total production in 1880.

The number of tons of rails rolled at West Mills in 1880 were:

	1880	1881	1882
Long Mills	2,000 tons	2,750 tons	30,000 tons
West Mills	1,000	1,000	7,000
			$\frac{1}{1,000}$ $\frac{1}{1,000}$
			1,000 1,000
At. 1880	3,000 boiler iron		1,000 tons

The West Mills rolled both pig iron and bar iron. The Long Mills began with the original mill as a furnace on a new principle of smelting iron direct from the ore. It proved a failure and was changed to a rolling mill for bar iron in 1874.

The At. 1880 rolling mill was owned by John A. 1880 with a capital of \$200,000 subscribed by some fifteen persons and others. The mill was changed to rolling boiler iron and in 1880 was added a mill mill. The machinery was built at the Long Mills iron works in Rotterdam, the cost of which was the largest sum at that date. The numerous financial troubles, it was ordered for sale by John A. 1880 and finally destroyed by fire in 1879.

In 1880, John A. 1880, A. 1880 and William A. 1880 of New York, Long Mills County, obtained letters patent from the United States Government for an improvement in the manufacture of wrought iron and steel. This invention consisted of using the same machinery for rolling steel direct from the pig iron wrought iron.

A native iron ore mine in Long Mills County was known as the 1880 mine and was added with the 1880 iron in 1880. The mine was 1880. Under this process steel was produced. The first

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The following table shows the number of ...
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Year	Production	Wages	Costs	Total	Per Ton
1900	117	120	11	148	1,744,000
1901	11	72	7	90	1,344,000
1902	9	6	4	19	1,844,000
1903	80	80	47	207	1,844,000
1904	104	76	59	239	1,844,000
1905	104	74	61	249	1,844,000
1906	104	74	61	249	1,844,000
1907	104	74	61	249	1,844,000

1

can scarcely work 200 days. The consequence is that miners and laborers of the region require higher wages--the same as bricklayers, etc. who only work a portion of the year, to make up for idle time. The operators have to pump water all the time, and keep up their establishments at great expense during this idle time; and while they ought, in consequence of these disadvantages, receive better prices, they are compelled to sell at lower rates. When occasionally there is a demand for coal, and they can obtain good prices there is a scarcity of vessels at Port Richmond. The trade is checked from this cause also, a direct outlet to the bay of New York which would give at least 250 working days in the year for our collieries, would check two-thirds of the turnouts and other difficulties that are constantly occurring in Schuylkill County.

THE ORIGIN OF MINE INSPECTION BY THE STATE

The large number of serious accidents in the mining industry, following each other in rapid succession, drew the attention of the public to the casualties in the mining of coal and means should be employed to prevent the great loss of life.

"In 1858 mining laws were discussed by the people of Schuylkill County, and a draft was prepared for presentation to the Pennsylvania Legislature in which was embodied an inspection of the anthracite mines by a qualified person under a state law, but was never acted upon. In 1865 a mining law was passed by one branch of the Legislature, and in 1869 a bill was passed for Schuylkill County, and John Altringham was appointed Mine Inspector who entered upon his duties, and made his first report to the Governor which the Legislature ordered published. An effort was made to extend it to

1869. The shaft which was the only outlet, was divided for the purpose of ventilation, by a wooden partition into two parts. The latter caught fire from a furnace used to produce the current of air in the mine, and the flames were communicated to the breaker, a large building also of wood placed directly over the mouth of the shaft, when the partition was destroyed, the air could no longer enter the mine, and the men to the number of 108 died by suffocation."

- Extract from paper read at the
American Social Science Association
in Philadelphia by Eckly D. Coxe.

A new law was passed by the Legislature April 5, 1870 under an act for the safety of the lives of the miners; and the counties of Schuylkill, Northumberland, Columbia and Dauphin were divided into three districts. The first district embraced all collieries south of Broad Mountain and extended east to the Carbon County line, and went to the west branch of the Schuylkill River, and Frank Smeltzer was appointed Mine Inspector for the district. The second district embraces all the collieries north of Broad Mountain, New Boston Basin and those of Columbia County, and John Littringham was appointed and made Mine Inspector for the district. The third district embraced all the collieries in Schuylkill County west of the branch of the Schuylkill River and Northumberland and Dauphin Counties, and David Edmunds was appointed Mine Inspector of the district.

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VENTILATION

In the earliest mining of coal in this Country no attention was paid to ventilation, as the openings in the veins had not as yet penetrated far enough to be affected, but as mining advanced further into the vein, it became necessary to provide sufficient

of coal at Port Carbon above the \$2.75 per ton; the basis price of contract work to be 8 1/4 percent, below the basis of 1869.

Resolved, that if this offer is not agreeable to the operators, we are willing to submit the question of wages, including all propositions thus far made by either side, to arbitration; to appoint committees of four on each side to support, by argument, their several offers. A committee was appointed to wait on Mr. Hendrick, President of the Anthracite Board of Trade to give him the result of the meeting.

John Siney, President.

"George Corbett, Secretary,
Pottsville, April 27, 1871

The following reply was returned in answer to the above:

Mr. John Siney, President--Sir: I am in receipt of resolutions passed by the Executive Committee of the W. B. A., April 27, 1871. In reply would say, that I have submitted it to the operators and they adhere to the proposition as made to the men on Saturday, April 22, 1871.

Yours truly,

William Hendrick,
President, A.B.T.

Arbitration was then decided on, and the following agreement was adopted:

"Articles of agreement made and entered into between the Anthracite Board of Trade, and the Miners and Laborers Benevolent Association this eleventh day of May 1871.

"We agree to submit for the decision of the umpire, Judge Elwell, the question of wages for Schuylkill County, for the year 1871, as follows:

1800	.75				
1810	.80				
1820	.85				
1830	.90				
1840	.95			.75	.00
1850	1.00			.75	.00
1860	1.05			.75	.00
1870	1.10			.75	.00
1880	1.15			.75	.00
1890	1.20			.75	.00
1900	1.25			.75	.00
1910	1.30			.75	.00
1920	1.35			.75	.00
1930	1.40			.75	.00
1940	1.45			.75	.00
1950	1.50			.75	.00
1960	1.55			.75	.00
1970	1.60			.75	.00
1980	1.65			.75	.00
1990	1.70			.75	.00
2000	1.75			.75	.00
2010	1.80			.75	.00
2020	1.85			.75	.00
2030	1.90			.75	.00
2040	1.95			.75	.00
2050	2.00			.75	.00
2060	2.05			.75	.00
2070	2.10			.75	.00
2080	2.15			.75	.00
2090	2.20			.75	.00
2100	2.25			.75	.00
2110	2.30			.75	.00
2120	2.35			.75	.00
2130	2.40			.75	.00
2140	2.45			.75	.00
2150	2.50			.75	.00
2160	2.55			.75	.00
2170	2.60			.75	.00
2180	2.65			.75	.00
2190	2.70			.75	.00
2200	2.75			.75	.00
2210	2.80			.75	.00
2220	2.85			.75	.00
2230	2.90			.75	.00
2240	2.95			.75	.00
2250	3.00			.75	.00
2260	3.05			.75	.00
2270	3.10			.75	.00
2280	3.15			.75	.00
2290	3.20			.75	.00
2300	3.25			.75	.00
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2370	3.60			.75	.00
2380	3.65			.75	.00
2390	3.70			.75	.00
2400	3.75			.75	.00
2410	3.80			.75	.00
2420	3.85			.75	.00
2430	3.90			.75	.00
2440	3.95			.75	.00
2450	4.00			.75	.00
2460	4.05			.75	.00
2470	4.10			.75	.00
2480	4.15			.75	.00
2490	4.20			.75	.00
2500	4.25			.75	.00
2510	4.30			.75	.00
2520	4.35			.75	.00
2530	4.40			.75	.00
2540	4.45			.75	.00
2550	4.50			.75	.00
2560	4.55			.75	.00
2570	4.60			.75	.00
2580	4.65			.75	.00
2590	4.70			.75	.00
2600	4.75			.75	.00
2610	4.80			.75	.00
2620	4.85			.75	.00
2630	4.90			.75	.00
2640	4.95			.75	.00
2650	5.00			.75	.00
2660	5.05			.75	.00
2670	5.10			.75	.00
2680	5.15			.75	.00
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2760	5.55			.75	.00
2770	5.60			.75	.00
2780	5.65			.75	.00
2790	5.70			.75	.00
2800	5.75			.75	.00
2810	5.80			.75	.00
2820	5.85			.75	.00
2830	5.90			.75	.00
2840	5.95			.75	.00
2850	6.00			.75	.00
2860	6.05			.75	.00
2870	6.10			.75	.00
2880	6.15			.75	.00
2890	6.20			.75	.00
2900	6.25			.75	.00
2910	6.30			.75	.00
2920	6.35			.75	.00
2930	6.40			.75	.00
2940	6.45			.75	.00
2950	6.50			.75	.00
2960	6.55			.75	.00
2970	6.60			.75	.00
2980	6.65			.75	.00
2990	6.70			.75	.00
3000	6.75			.75	.00

1864	3.39
1865	7.36
1866	5.80
1867	4.37
1868	3.36
1869	5.31
1870	4.39
1871	4.46
1872	3.74
1873	4.27

About April 1871, attention was attracted to the coal land purchases of the Philadelphia and Reading Coal and Iron Company, the stock of which is all owned and controlled by the Philadelphia and Reading Railroad Company. The Reading Company was authorized to issue bonds to the amount of \$25,000,000 to invest in lands, and within a year this company had purchased 70,000 acres of land in what was termed the Schuylkill and Shamokin Regions, the tonnage of which is almost entirely controlled by the Philadelphia and Reading Railroad Company. They own lands in Schuylkill County on which there are already 75 workable collieries and in the adjoining counties of Columbia and Northumberland, the additional number they own will swell the number to about 100, over which they own and have controlling influence.

The Lehigh Valley Railroad Company have purchased the Delano lands in Schuylkill County, and they hold controlling interest in the Locust Mountain Coal and Iron Company lands in Columbia and Northumberland Counties, and also in the New York and Middle Coal Field Company's lands and own one half interest in the Trevorton

Company's lands. In the Shamokin Region, the Mineral Railroad and Mining Company have also commenced purchasing lands. The Philadelphia and Reading Coal and Iron Company, Lehigh Valley Railroad Company, and the Mineral Railroad and Mining Company connected with the Northern Central Railroad Company control and outlets to market.

1873

President Gowan of the Philadelphia and Reading Railroad inaugurated a policy of encouraging the trade of the line in every possible manner, by offering to loan the bonds of the Company for one-half the cost of the erection of iron works on the line and the erection of other large manufacturing establishments. When met with the difficulty of procuring a sufficient quantity of iron ore for the use of the furnaces that may be erected, he immediately commenced the development of extension bodies of ore lands near the line of the road, in Cumberland County; in Virginia, and also at points where they can obtain return cargoes of coal to and near these points. For the last two years, under this policy, the consumption for coal on the line of the road and its branches has been increased 564,165 tons.

The incorporation of the Philadelphia and Reading Coal and Iron Company was developed by the conditions pertaining to the Anthracite coal trade. Prior to 1872 nearly all the operators became bankrupt with few exceptions. Some of whom were saved from failure by the purchase of their collieries by the Philadelphia and Reading Coal and Iron Company. President Gowan of the Phila-

delphia and Reading Railroad Company seeing the conditions and knowing that the tonnage from the coal regions was vital to his railroad, and with the knowledge that other railroads were encroaching more each year in the territory covered by his road, developed a plan to protect his company's interest in gaining control by purchase of coal lands and collieries in Schuylkill, Columbia and Northumberland counties, thereby insuring the Reading Railroad tonnage from collieries located upon these lands.

Following President Gowan's plan to establish a company to insure tonnage in the coal trade from the southern coal field, the board of directors authorized an expenditure of \$25,000,000 to be invested in coal lands. The Laurel Run Improvement Company was chartered by act of assembly May 18, 1831, and the new company formed under the name of the Philadelphia and Reading Coal and Iron Company as a holding company, took over the Laurel Run Improvement Company by decree of court order December 12, 1871.

The segregation of the Railroad and Coal Company was made in final decree of the United States District Court on June 28, 1923 "That the joint liability of the Company and Reading Company shall be severed". The total acreage purchased by the Philadelphia and Reading Coal and Iron Company as of 1872 was

73,301 acres in Schuylkill and Columbia Counties.

22,373 acres in Northumberland County

95,674 total acres.

These lands embraced sixty-six (66) collieries in Schuylkill County, three (3) in Columbia and twenty-seven (27) in Northumberland County or a total of 96 collieries.

The Lehigh Valley Railroad Company in 1872 owned lands in

Schuylkill County on which there were located ten (10) collieries. At the same date the Lehigh and Susquehanna Railroad Company and the Lehigh and Navigation owned lands in Schuylkill County on which four (4) collieries were working. The Mineral Railroad and Mining Company combined with the Shamokin Branch of the Northern Central Railroad owned four (4) collieries in the district, leaving but four (4) collieries not owned by the different carrying companies then opened in 1872. There were only thirteen (13) small collieries working (1872) in the southern field on lands not owned by the P. & R. C. & I. Company and the Lehigh and Susquehanna Railroad Companies. In the Mahanoy Region there were twenty-one (21) collieries worked on other lands than those owned or controlled by these companies of which eleven (11) were on the Girard Estate, seven (7) on lands of Gilbert and others, two (2) on the Cuyler lands and one (1) on the New Boston lands. These large holdings of coal land brought the attention of the public and the cry of monopolies was heard both socially and politically that the State Legislature was compelled to institute an investigation as to its legality and on July 29 & 30, 1875 the committee appointed by the Legislature convened at Atlantic City to hear President Gowan's explanation.

The following extracts are taken from President Gowan's Argument before the joint committee of the Legislature of Pennsylvania at Atlantic City on July 29 and 30, 1875:

"The Schuylkill and Mahanoy coal fields together contain two hundred and thirty seven square miles of coal; the Wyoming coal field contains only one hundred and ninety-eight. The Schuylkill and Mahanoy region, the Schuylkill particularly, was the first one opened (Page 17.) In the year 1840, the Schuylkill region produced 490,596

tons of coal and the Wyoming region produced only 143,470 tons. The product of the Schuylkill region was more than three times as large as that of the Wyoming region. In 1850 the Schuylkill region produced 1,840,620 tons and the Wyoming region 827,823 tons. This was about the period when the large corporations in the Wyoming region were going into business extensively as miners of coal.

"The tonnage of the Schuylkill region had increased in 1860 to 3,749,632 tons or about double; while that of the Wyoming region had increased to 2,941,817 tons or more than trebled. At the end of the next ten years, while the Schuylkill had only increased in 1870 to 4,851,855 tons or twenty-nine percent, in ten years, the Wyoming region increased from 2,941,817 tons to 7,825,128 tons or one hundred and sixty-six (166) percent within the same period. Here was an increase of one hundred and sixty-six per cent against twenty nine, due to the fact that the Wyoming region was controlled by large corporations which could expend money in developing the lands, and who were not liable to be prostrated by monetary panic.----

"The Reading Railroad Company had no right under its charter to own mines, or to own lands, or to engage in the business of mining coal to supply its line with tonnage, but every other Pennsylvania coal-carrying corporation whose outlet was the City of New York had such right. The Delaware and Hudson Canal Company was chartered by the Legislature of Pennsylvania and had the right to mine coal, to own coal lands and to transport coal. The Delaware, Lackawanna and Western Railway Company chartered by **the** State of Pennsylvania had the same right. The Pennsylvania Coal Company chartered by the State of Pennsylvania possessed exactly the same right. The Lehigh Coal and Navigation Company chartered by the State of Pennsylvania

possessed the same right. The Lehigh Valley Railroad Company was the only company which originally was in the same position as the Reading Railroad Company; but, by its merger with the Beaver Meadow Railway, it acquired the right to be an owner of coal lands as well as a transporter of coal. --- Each one of the avenues of transportation controlled by these five companies led directly to the City of New York. The business of each of them was to build up the City of New York with the produce of Pennsylvania in antagonism to the Reading Railroad whose only outlet was the City of Philadelphia --- (Page 5)

"In 1870 and prior to that time, the Lehigh Valley Railroad Company had extended a line of railway through the heart of the Mahanoy coal field side by side with our own. It had purchased large bodies of lands, and was engaged in diverting a traffic which originally had gone by the Reading Railroad to Philadelphia to the City of New York, by its own line. The Pennsylvania Railroad Company had acquired the control of the Northern Central Railroad, and through it had secured the Lykens Valley Railroad and the Shamokin And Pottsville Railroad. The former was extended into our southern field at its western end. The Shamokin Valley and Pottsville Railroad, which entered the coal field from Sunbury was extended where it had already secured a large body of land. Further than that, a coalition between the Lehigh Valley Railroad Company, the Delaware, Lackawanna and Western Railroad Company and the New Jersey Central Railroad Company was formed for the purpose of building a railroad along almost the entire length of the southern coal field. These three large and wealthy corporations had located a line from near Tamaqua through the centre of the southern coal field, encroaching upon the territory

upon which the Reading Railroad depended for its tonnage. Such was the position of the Railroads in 1870.

"In the opening of 1871 we had one of the most disastrous strikes in the coal region that we have ever experienced. That strike completely prostrated individual enterprise; threw upon the market large bodies of land which were at the mercy of the rival companies who were attacking us, and we determined to go into the matter as a corporation and to ask the Legislature to pass an act of incorporation for the formation of an Auxiliary Coal and Iron Company.-----".

"THE ENTRANCE OF THE PHILADELPHIA & READING COAL &
IRON CO. INTO THE BUSINESS OF MINING COAL

"Our first intention was never to mine a ton of coal. The idea was that the ownership of these lands would be sufficient to attach the tonnage to us, and that we could get individuals to mine the coal at a rent. That was the policy inaugurated by the company and to develop it they expended probably eight hundred thousand or nine hundred thousand dollars (\$800,000 or \$900,000) simply in loans to individuals to enable them to get into business. We built collieries, rented them to individuals, and advanced money on mortgage and had it not been for the terrible demoralization of labor in the coal regions resulting in strikes, individuals would have been able to do all that we wanted. But we had, during the time I speak of, a succession of strikes which entirely destroyed individual enterprise. There was no man who had capital to stand up against them; six months out of a year they were idle; and we saw that we had to "take the bull by the horns" and go into the

business of mining ourselves. We tried honestly and sincerely for nearly eighteen months to develop these lands and work them by individual enterprise but were unsuccessful, and we had to take hold of the coal trade as we took hold of the Railroad - establish ourselves in it as a large corporation with fixed rules, and the result has been what you have seen and have been investigating. (Page 22).

"Look now at the manner in which the business was conducted in those days, and what it became necessary for us to do. You have heard enough from the evidence to know that it was a rare exception that the miner sold his own coal. There had grown up a system of business by which factors, gentlemen of wealth, established themselves in the port of Philadelphia at the terminus of the Reading Road, and took charge of the product as it reached tidewater. I do not wish to reflect unnecessarily upon these gentlemen, nor do I suppose that they deserve to be reflected upon. They had a right to earn money in that way - it had been established by custom; but I say to you that there never grew up and flourished a more iniquitous system in the world, and every man who has been mining coal in Schuylkill county during the last thirty years will testify in my favor upon this point'. They levied a charge of twenty-five or thirty cents a ton for the mere sale of the coal, entirely irrespective of the sum of money it brought. The lower the coal sold the better it was for them because they sold on a guarantee commission. The Reading Railroad Company in those days weighed the coal strictly to the very pound, and allowed five percent for waste; and it allowed ten cents a ton as a bonus for every car dumped at Port Richmond before four o'clock of the day it came down. The

practice that had grown up in Philadelphia was, that the five per-cent for waste and the ten cents for dumping the car were taken by the factor as a consideration for his paying the shipping expenses when the shipping expenses were twenty cents a ton, the aggregate of these two items (the dumpage and the five percent) was about thirty cents, and so there was an additional profit of about ten cents; and I am within bounds when I say that the average profit of doing this business was about forty cents a ton - so that when coal sold for one dollar and seventy-five cents at the mines, nearly twenty-five percent of the value of the product was paid to the middleman for passing it through his books.

"These gentlemen, the factors sat at the water's edge like leaches, sucking the life blood of a healthy trade; and as one after another dropped off, gorged to repletion, others took his place until the emaniatedbody handed over to us hardly seemed worth the effort of preserving. Everybody knew it, it was the talk of the community. I practiced law for seven years in the County of Schuylkill and in all that time, and up to it, there were but three men who ever retired from the business of mining coal with any money. There was no Orphans Court business in that county. I never drew a will in my life but one, and the man for whom I drew that had no money. Every man's estate was settled by the sheriff before he died. I lived through all these times in that county, and I am glad to say that it was the result of that experience which enabled me to make a vow that if it ever came into my power, I would try to do something to make that County prosperous -----(page 23).

"Having once concluded to go into the business, we made up our minds that we would sell our own coal. You see, therefore, the

reason for the opposition of these gentlemen. We shipped last year of the business formerly done by factors, one million three hundred thousand tons of coal. At forty cents a ton, here was five hundred and twenty thousand dollars annual profit taken out of the pockets of eight or ten men. No wonder they looked angry, no wonder they declared war. Think gentlemen, of five hundred and twenty thousand dollars a year for doing nothing, taken out of the pockets of eight or ten men. No wonder they think badly of us, because we deprived them of the profits in which they were accustomed to participate.

COAL CONSERVATION

Mr. Edward W. Parker, Statistician in charge of the Division of Mineral Resources of the U.S. Geological Survey on the Conservation of Coal, in his paper read at the Spokane meeting of Mining Engineers in September 1909, says: "We are cognizant of the suits brought by the Government against the anthracite operators in Pennsylvania, or in combination of interests commonly known as the "hard coal trusts". No defense of any illegal combination in restraint of trade is intended, but there are some facts which should not be lost sight of, and unfortunately those whose opinions are based upon the news given to us by the daily press are likely to be governed by exparte testimony. The present situation in the anthracite region is one that has been developed through sheer necessity, if the conservation of the supply of anthracite and the prolongation of the life of the fields in the best interests of the people were to be attained in any other way than through Government control, and Government control did not seem to be materializing. I believe that a

good part of the history of anthracite mining has been one of profligate waste in the mining, preparation and use of that precious supply of fuel; and this has only been remedied, none too soon, and could under the circumstances, only be remedied, by the close control and conservative management which has been brought about in recent years.

"And I might pause here to pay a merited tribute to such men as Dr. Raymond, Eckley B. Cox, P.W. Sheaffer, Franklin B. Gowan, William Griffith, and a few others through whose efforts many reforms which lessened the waste of anthracite were effected. They were the pioneers in the battle for conservation and a monument should be erected to them.

"The securing by the Reading Railroad for its offspring, the Philadelphia and Reading Coal and Iron Company of the great coal reserves it owns today, was the beginning of a great movement which was foreseen by those in a position to see. The Reading Company was temporarily bankrupted through its guarantee of the debt thus incurred, but the possession and control of those lands are indirectly the most valuable assets of the railroad at the present time. More than this, however, in the ultimate economy of things, has been the preservation of thousands of acres of coal lands from reckless spoilation. The way was paved for the safe and sane control of the anthracite industry albeit by a trust, and a stop was put to the cutthroat competition and extravagant methods which in earlier years had resulted in losses of millions of dollars in money and more than millions of tons of coal.

"Under former conditions in the anthracite regions, when it was not considered necessary to give thought to the morrow, and

indeed up to the time when the Anthracite Coal Waste Commission made its report, it was estimated that for every ton of coal mined and sold 1.5 tons were lost. The greater part of this loss was in the coal left in the ground as pillars to protect the workings, while millions of tons of small coal or screenings were thrown on the culm banks which now form unsightly mountains in the coal regions. Improved methods of mining and preparation have of late years reduced the percentage of waste so that at present (1909) the recovery will average about 60 percent and the loss about 40 percent."

Dr. Rosser W. Raymond, United States Commissioner of Mining Statistics, in his report to the Secretary of the Treasury on the present conditions and prospects of the mining industry, "The Mining of the West" chapter on mining education, Page 224, he foreshadowed in 1869 over 60 years ago, the lesson of economy in the development of our mining resources and in the reckless and wasteful mining operations. Dr. Raymond in the course of his paper on Conservation by Legislation delivered before a notable joint meeting of engineers held in New York, March 24, 1909 said, 'I remember well what Eckley B. Cox said to me, that salvation for the anthracite region and its store of natural resources, lay in the control of the collieries by capitalists who had other aims than immediate profit from the coal; and that the acquisition of such control by great railway companies, whose interest it was to make anthracite the basis of a profitable freight business for generations to come, was not only the best, but the only remedy for the reckless and irreparable waste which the system of 'hogging' the mines under short leases had brought about.'

"Dr. Raymond further added (speaking of Mr. Cox's prediction):

'The results verified his prophecy. The great railway companies operating the anthracite collieries have put more money into preliminary dead work and costly machinery have been the pioneers of national forestry for the provision of permanent supplies of mining timber; have enforced economy in every department of production; have trained and employed the most skillful engineers and experts; in short have redeemed from immediately impending rack and ruin the whole anthracite industry.'

"Whether, indeed, it is a profitable matter to attempt to imagine the state of the anthracite region 300 or 400 years hence with its coal practically exhausted, is open to question; but those who come after us have a long time in which to consider the problem and we may safely leave it to them to solve in their own way.

In 1877 the Philadelphia & Reading Coal & Iron Company introduced coal waste from the collieries, for generating steam in their stationary boilers at their Reading Shops. More than 15,000 tons of this waste material was consumed during the year, thus taking the place of prepared coal at a considerable saving in cost. This utilizing of coal waste was such a pronounced success, that two locomotive engines were adapted to the use of waste coal as fuel. These engines performing so successfully, further applications of the plan were extended for a general use of the waste material for their locomotives on the main line and branches.

The first locomotive engine adapted for the use of coal waste completed its seventh year in coal and freight service covering in that time 183,904 miles.

SHIPMENTS FROM SCHUYLKILL REGION

1820		1845	1,131,724	1870	4,851,855
1821		1846	1,308,500	1871	6,552,772
1822	1,480	1847	1,635,735	1872	6,694,890
1823	1,123	1848	1,733,721	1873	7,212,601
1824	1,567	1849	1,728,500	1874	6,866,877
1825	6,500	1850	1,840,600	1875	6,281,712
1826	16,767	1851	2,238,525	1876	6,221,934
1827	31,360	1852	2,636,835	1877	8,195,042
1828	47,284	1853	2,665,110	1878	6,282,226
1829	79,973	1854	3,191,670	1879	8,930,829
1830	89,984	1855	3,552,943	1880	7,554,742
1831	81,854	1856	3,603,029	1881	9,253,958
1832	209,271	1857	3,373,797	1882	9,459,288
1833	252,971	1858	3,273,245	Total	183,207,360
1834	226,692	1859	3,448,708		
1835	339,508	1860	3,749,632		
1836	432,045	1861	3,160,747		
1837	530,152	1862	3,372,583		
1838	446,876	1863	3,911,683		
1839	475,077	1864	4,161,970		
1840	490,596	1865	4,356,959		
1841	624,466	1866	5,787,902		
1842	583,273	1867	5,161,671		
1843	710,200	1868	5,330,737		
1844	837,937	1869	5,775,138		

Distribution of Coal from Port Richmond

Statement showing the coal transported by the P. & R. R. R. to
Port Richmond and its distribution to the States and Counties.

-Bannan Coal Trade Statistics
Furnished by Thos. M. Richards, Ship. Agent.

Year ending November, 30

Port Richmond to	1869	1870	1871	1872	1873
New Brunswick	5582	6987	8238		7772
Canada	1551	1370	4713	14809	
Nova Scotia	1677	238			1724
Maine	81246	61181	86092	85705	100633
New Hampshire	37433	25623	40000	37866	49607
Vermont	334			1758	850
Massachusetts	878944	785170	908410	1022878	997836
Rhode Island	145401	111662	179370	134111	142433
Connecticut	100156	56419	92500	47618	74931
New York	611457	390576	525240	359353	359892

New Jersey	140630	126473	150280	112749	106202
Pennsylvania exclu- sive of Phila.	206693	195237	191896	198375	150046
Delaware	12237	15576	13403	12132	8093
Maryland	4877	7955	2799	11687	22803
Dist. of Columbia	59608	73471	56875	77560	101387
Virginia	49827	45244	38624	119139	85519
North Carolina	4361	3070	3751	6728	6292
South Carolina	9382	14974	10304	13052	11402
Georgia	7327	11740	8625	11700	10717
Florida	4057	3396	1364	5533	7330
Alabama	2990	2821	5346	4288	1995
Louisiana	1355	2936	6625	1863	1534
Texas	422	1190	1196	1658	3834
California	1043			3714	1205
Alaska	1120				
Cuba	3348	2932	262	150	7613
South America	2553				421
Mexico	1380			900	
West Indies	1123	3529	7055	14014	
Hayti		700			
Mississippi				428	
Porto Rico				10	
England				65	
Sandwich Islands					722
TOTALS	2378078	1951467	2343026	2299845	2266893

GEOLOGICAL SURVEY

In the early days of mining there was very little known of the geology of the Coal Region. It is true there were a few experienced miners who came from abroad who had a slight conception of the basins and saddles, but the general opinion was that each outcrop of coal was a separate vein and was believed not to extend much below the surface of the ground. Mr. John Beadle, an Englishman employed as manager at the Gate Vein Colliery located at Centre and Nicholas Streets in Pottsville was the first to suggest the undulations of the measures. In Bannan's and Daddlow's Coal, Iron and Oil, is given the following facts; "It may be justly stated that an English miner was the first to suggest a theory for the repetition of the veins. The first sketch ever made of the undulations of

the Anthracite measures was made by Mr. John Beadle, then managing the Old Gate Vein Colliery at Nicholas and Centre Streets for man and Williams on the walls of the Mine Office; and the sketch remained on the walls of the office for years and was often discussed and observed by many who since claim for themselves the credit of originators. Although the rough chalk sketch alluded to did not attempt a correct deliniation, it still presented the suggestion which has since been developed in fact".

Mr. John Beadle was evidently one of the few exceptions noted later in J.P. Lesley's Historical Sketch of the Geological Explorations. As mining increased and capital was invested, it became apparent that explorations must be continued and a better knowledge of mining possibilities developed. Messrs. Potts and Garragues began to sink below the surface and prove the basins that were now generally accepted. The sinking of this slope proved the soundness of the theory of the undulation and later slopes were sunk in several places. This new venture attracted the attention of capitalists and finally the Pennsylvania State Legislature became aware of the importance of a geological survey, and on March 29, 1836 passed an act appointing a survey of the state and authorizing an annual appropriation of expenditures of \$6400 for five years, to pay the salaries of a geologist, two assistants and a chemist. Professor Henry D. Rogers was appointed geologist, Mr. James C. Booth and Mr. John F. Frazer, assistants and Dr. Robert E. Rogers, Chemist.

Extracts from Historical sketch of Geological Explorations by J.P. Lesley.

"The first season's field work sufficed to make known with

certainly the geological order of the rocks of middle Pennsylvania; and on this determination, as a sure foundation, all subsequent work in the Appalachian Mountain belt of the Atlantic States was based. Historical sketch - Second Geological Survey - A-P53.

"The second year of the geological survey was 1837.

"The Act of Legislature of March 29, 1836 was amended in the Spring of 1837 by enlarging the appropriation to allow four assistants. These were Mr. Samuel S. Halderman, Mr. Alexander McKinley, Mr. Charles B. Trego and James D. Whelply - A-P56

"The expense of the first year had been but \$2700.

Those of the second year amounted to \$6500.

"The third year of the Geological Survey was 1838.

"The corps was increased and the expense rose to \$12,000. In 1838 was a year of great revelations in the history of coal geology. The identity of the anthracite and the bituminous coal measures was demonstrated beyond a doubt although most, if not all, English geologists still persisted in calling the anthracite an older formation. And a long stride was made toward the actual recognition of the same individual coal beds at Pittsburgh and Pottsville. A-P 71.

"In the preceding year, 1837, sufficient notice had been taken of the small crest waves (anticlinal) which traverse the anthracite region, and separate the small trough waves (synclinals) from one another. Mr. Whelply had begun to trace and map them all.

"In 1838, he got the axes or central lines of these waves into their places on his map and showed how they passed through one mountain after another; how they bent the straight mountains into hooks; and how they crossed the red shale valleys of XI and passed through the mountains of X into the open country of VIII - A P72. It is not

unfair to the geologists of the Old World to say that topographical geology was born in Pennsylvania in 1838. As there is but one such anthracite coal field known in the world, so there is no field of investigation for the topographical geologist so perfectly adapted in all respects for suggesting at sight, the principals of his branch of science. Topography was master of the situation. Whelply constituted himself thus the first perfect topographical geologist our science had. Mr. Whelply's map of the southern and middle anthracite coal fields was one of the most important contributions to physical science ever made, in any country. Its eminent qualities can be appreciated only on reflection that it was not only topographical, but geological; and it was accomplished by himself alone, in the infancy of geological science. A-P80

"The fourth year of the survey was 1839.

"The cost of the survey in 1839 amounted to \$15,991.

"Mr. Whelply and Mr. Sheaffer resigned and Dr. Andrew A. Henderson of Huntington and Mr. Peter Lesley, Jr. of Philadelphia were added to the corps.

"The fifth year of the geological survey was 1840. The expenses of the survey reached the maximum of \$17,800. The sixth year of the survey was in 1841. (A P106.) The field work came to a close this year; the expenses of the survey falling to \$12,675.

"The winter of 1841-42 was passed by the Legislature without the usual amount of appropriation for the geological survey".

"Great indeed must have been the "financial embarrassment" of a Commonwealth when its economies descend so low as to decline such inexpensive appropriation for securing the continuation of a

national enterprise and for reaping from it a national benefit. The mines of the state were (with some most honorable exceptions) bossed by the commonest miners from foreign and quite different geological regions; who suddenly exchanged the character and position of hewers of coal and pumpers of water at home for the character and position of Mining Engineers in America. Ignorant, undisciplined, obstinate, narrow-minded and superstitious by nature and habit, and rendered presumptuous and dogmatic by their strange advancement, they were unwilling to accept as they were unable to acquire knowledge of our geology so different from their own, and hated the professional geologist because they had never lived in childhood, pick in hand, underground; because they taught new things hard to comprehend and because they denied the propriety of mining the coal of Schuylkill County on the plan of the collieries of South Wales, or employing the ancient methods of the Cornish tinworks to the brown hermitite banks of the Lebanon Valley.

"The jealousy of professional and theoretical interference with tradition and practical usages, which had not yet quite disappeared from the mining region, was in 1842 in all its vigor; and was shared by the landed proprietors, the directors of companies and the General Superintendents of collieries and miners with a wave of suspicion and dislike pushed before it by the first geological survey through its whole progress, brought it at last to a dead stop".

"Mr. P.W. Sheaffer who was on the staff in 1837 resigned in 1839 and resumed his private engineering work. "In 1850 the subject of the publication of the fruits of the first survey was discussed by a number of gentlemen among whom Mr. William Parker Foulk of Philadelphia was the most prominent. With the aid of Mr. Peter ..

Sheafer of Pottsville, these gentlemen succeeded in representing the case so forcibly, that the Legislature was induced to appoint a joint committee of both houses, of which Colonel Bigham was chairman to consider the subject of an appropriation to cover the estimated expense of publication.

"In 1851 the Legislature appropriated \$32,000 for the survey and the field work of the first geological survey of Pennsylvania re-commenced. Mr. P. W. Sheafer having settled permanently in Pottsville, had become the principal local geologist and mining engineer of the region, and now knew more about its geology than anyone else, took charge of the underground work. Mr. John Sheafer took charge of the Transit and Level party. Long straight transit lines were leveled and staked from side to side of each coal field at intervals of 2000 ft. Longitudinal lines were then run, tying the cross lines together, with these Mr. Sheafer connected every gangway, mouth, shaft, slopes and test holes which then existed and carried his surveys along these underground passages." A P 122-125.

The final report of the Geological Survey of Pennsylvania was made by Henry Darwin Rogers, State Geologist and was published by J. B. Lippincott of Philadelphia in 1858.

The Second Geological Survey of Pennsylvania

The southern field is most advantageously situated as to tidewater markets; it is only some 93 miles from Pottsville to Philadelphia with gentle and favorable grades all the way. This was one of the first basins to be developed and for a number of years between 1825-1850 its product exceeded that of any of the upper divisions; but as it became known that the coal beds of other fields, generally, contained less refuse and were more re-

liable, its relative production grew less and it now stands (1880) at the foot of the column. The exhaustion of the cheaper mined coals in the other basins will no doubt in time place the southern field by reason of its great and enormous coal content, once more in the front rank. P 2073 - Final Report 2nd Geological Survey.

The Second Geological Survey was authorized by Act of Legislature passed May 14, 1874 and the final summary report was published in 1895.

Mr. Rogers in his final report states that "the Pennsylvania geology owes it consistency and completeness to the frequency with which every part of the state was gone over, not only by the same but by different members of the corps. Not a shadow of doubt or suspicion of grave mistake was left attached at the end of 1841". As a consequence, the assistants of 1874 remarked with astonishment and pleasure how perfectly trustworthy the map and reports of 1858 are and so far as they pretend to represent what twenty six years ago could be observed.

The report of the First Survey of Pennsylvania in this respect, stands quite by itself among American publications of its class and date.

(A-P107)

FAILURES OF OPERATORS IN THE SOUTHERN COAL FIELD

YEAR	OPERATOR	COLLIERY	REASON
1825	John White	West Delaware	Failed
1829	Peter Aurand	Belfast	"
1831	Wheeler & Merritt	Phoenix Tunnel	"

1832	Bolton & Co.	Belfast	Failed
1835	Daniel Rhoads	Valley Furnace	Sheriffed
1836	Bennett & Walton	Oak Hill	Failed
1838	Neligh, Bull & Lewis	Mammoth	Sheriffed
1840	Samuel Lewis	Greenwood	Failed
1840	Toten & Wholons	Silver Creek	"
1840	Turner & Whitney	Belmont	"
1841	Jos. Kunkle	Ravensdale	"
1841	Hudson & Pinkerton	Hickory	"
1842	North America	Centreville	Sheriffed
1843	Wm. Man	Beechwood	"
1844	McAlarney	McAlarney Tunnel	"
1844	Richard Kear	Orchard	"
1844	James C. Oliver	Westwood	"
1844	John Afferman	Phoenix Peach Mtn.	"
1844	Chas. Lawton	Mill Creek	Failed
1844	Palmer & Garagues	Bear Ridge	"
1844	Thos. Fitch	Silver Creek	"
1844	Wm. Lawton	Peacock	"
1844	Caleb Parker	Silver Creek	"
1845	Goodman Dolbin	Patten Valley	Sheriffed
1845	Jacob Serrill	Serrill's Tunnel	"
1845	John Platt	Peach Mtn.	"
1845	Thos. Ridgway	Lee Lands	Failed
1845	Wm. Bosbyshell	Silver Creek	"
1845	Thos. Williams	Beechwood	"
1845	Henry Wren	Middleport	"
1845	Charles Lawton	Donaldson	"

1845	Jos. Lyons	Lyons Drift	Failed
1845	Abraham Pott	Port Carbon	"
1845	Wm. Wallace	Cumbola	"
1846	John Ogden	Westwood Gap	Sheriffed
1846	Hewes & Baber	Eagle Hill	Failed
1846	Chas. Lawton	Peacock	"
1847	John & Thos. Wood	Westwood	"
1847	Aquilla Bolton	Silver Hill	"
1847	Hugh Kinstey	Milford	"
1847	Chas. Lawton	Ball's Peach Mtn.	"
1848	Clayton & McGinnis	Gate	Sheriffed
1848	Pott & Bannan	Guinea Hill	Failed
1848	George Potts	York Farm	"
1849	E.W. McGinnis	St. Clair Shaft	"
1849	Abraham Heebner	Silver Creek	Sheriffed
1850	Henry Heil	Mt. Eagle	"
1850	Jos. Lawton	Mammoth	"
1850	Dr. Steinberger	Sharp Mtn.	Sheriffed
1850	Jos. Taylor	Diamond	"
1850	Jacob Hoffman	Silverton	Failed
1850	Milnes & Haywood	Westwood	"
1850	Oliver & Beechem	Beechem's Tunnel	"
1850	Haywood & Snyder	Mill Creek	"
1850	James C. Oliver	Bear Ridge	Sheriffed
1850	Milnes & Haywood	Salem & West West	Failed
1850	Chilas	Junction Drift	"
1850	Dr. Steinberger	Melford	Sheriffed
1850	Dr. Steinberger	Sharp Mtn.	"

1851	Henry Strong	Lorberry	Sheriffed
1851	Wm. Donaldson	Tremont Mines	"
1851	Chas. Reinhold	Colket	"
1851	Snyder & Bar	Tremont	"
1851	Patten Brothers	Primrose	"
1851	Oliver & Beechem	Tuscarora	"
1851	Bennett & Erdman	Woodburn	Failed
1851	James Fitzsimmons	New Phila.	"
1851	Chas. Lawton	Chamberlain	"
1851	Job Rich	Woodburn	"
1851	Clayton & McGinnis	Gate Vein	"
1851	Tuscarora Co.	Tuscarora	Sheriffed
1851	Wm. Dewey	Dewey Tunnel	Failed
1852	Dr. Steinberger	Middleport	Sheriffed
1852	Geo. Deb. Heim	Lee Lands	"
1852	Jos. Lawton	Repplier	Failed
1852	Jos. T. Taylor	Diamond	"
1853	M.G. & P. Heiliner	Black Valley	Sheriffed
1853	M.G. & P. Heiliner	reach Mtn.	"
1853	M.G. & P. Heiliner	Westwood	Sheriffed
1853	Richard Jones	Oak Hill	Failed
1853	Wm. & John Payne	Paynes Tunnel	"
1853	Bainbridge	Chamberlain	Sheriffed
1853	Thos. Haven	"	"
1853	Anthony Steinberger	Middleport	"
1854	Bettinger	Dundas No. 6	"
1854	Everts	Everts Tunnel	"
1854	Jacob Serrill	Serrills Tunnel	"

1854	Bettinger	Bettinger Slope	Sheriffed
1855	Thos. Christopher	Port Carbon	"
1855	Oscar Moore	Bear Ridge	"
1855	Thos. Pollock	Feeder Dam	Failed
1855	Gus Shollenberger	Novelty	Sheriffed
1855	John Shouthers	Tuscarora Lands	"
1855	M. G. Heiliner	Mine Hill Gap	"
1855	Dauphin & Susquehanna		"
1856	Price	Peach Mtn.	Failed
1856	Shultz Brothers	Shultz Tunnel	"
1857	Montelurs & Whitfield	Windy Harbor	Sheriffed
1857	Geo. Potts	York Farm	Failed
1857	Harper & Rex	William Penn	"
1857	Brooke & Burey	Branchdale	Sheriffed
1857	Buery & Buery	Primrose	"
1857	Britton Brothers	Lewis	"
1857	Harper & Rex	Wm. Penn	"
1858	Segar Chadwick	Middleport Shaft	"
1858	Buery	McDonald	Failed
1859	Union Canal		Sheriffed
1859	R.H.F. Horton	Colket	Sheriffed
1859	Henry Eckel	Tremont	"
1859	Martin Weaver	Branchdale	"
1859	Geo. Rickert	Oak Hill	"
1859	Lawrence O'Brien	Middleport	Failed
1859	Roger Sinnickson	Kaska William	"
1859	Francis Spencer	Lewis Shaft	"
1859	James Fitzsimmons	Flowery Field	"

1859	Dorman & Whitfield	Oakland	Failed
1859	Samuel Sillyman	Big Creek	"
1860	Henry Strong	Lorberry	Sheriffed
1860	Samuel Sillyman	Westwood	"
1860	Benjamin Tyson	Silverton	"
1860	Geo. Repplier	Repplier	"
1860	"	Lewis	"
1860	Mason & James	Flowery Field Tunnel	Failed
1861	Wm. C. Smith	E. Pine Knot	Sheriffed
1861	Wm. C. Smith	W. Pine Knot	"
1862	James Carter	Greenwood	Failed
1862	J. K. Smith	Tuscarora	"
1862	Benj. Bullock	Peach Orchard	Sheriffed
1866	Pottsville Mining Co.	Lewis	"
1867	Wm. Saylor	Monitor	"
1867	Robt. Ratcliff	Mt. Laffee	"
1867	Starr Coal Co.	Windy Harbor	"
1867	"	Ledger Vein	"
1867	Jos. Beechem	Beechem Tunnel	"
1867	James Oliver	Silver Creek	"
1868	Levi Spangler	Eureka	"
1868	Eten & Tomison	West End	"
1868	Albert Eckel		"
1868	Dutter	Marshfield	Sheriffed
1868	N.Y. & Sch. C. Co.		"
1868	Chas. M. Hill	Black Valley	"
1868	Jonathan Wright	Black Heath Tunnel	"
1868	Wm. & James Roher	Rothersville	"

1868	Thos. Shollenberger	Glendower	Sheriffed
1868	Jos. Taylor	Taylor Tunnel	"
1868	John Volpert	Volpert	"
1868	John Bracken	Silver Creek	"
1869	Denican & Bright	Windy Harbor	"
1869	Martin Weaver	Jenks	"
1870	Jackson	St. Clair	"
1871	Gideon Whetstone	Tamaque Shaft	Failed
1871	Pomroy & Rickert	Revenue	Sheriffed
1872	Diamond Coal Co.	Glentworth	Failed
1872	John Northall	Commercial	"
1872	DeSocarez	Pottsville Gap	"
1872	John C. Northall	Phoenix Park	Sheriffed
1872	Charles T. Yerks	Pyne	"
1872	"	Swatara	"
1874	John Prout	Live Oak	"
1874	J. C. Oliver	Eagle Hill	Failed
1874	John Lucas	Richardson	Sheriffed
1874	"	Oak Dale	"
1875	Wm. Starr	Ravensdale	Failed
1877	Loyd & Glover	Phoenix Park	Sheriffed

Royalties paid by the collieries operating on the Lee Lands situated north of St. Clair Borough:

Shipments and royalties copied from the books kept by Samuel Huntzinger and Samuel Wetherell, August 14, 1843.:

Beck and Woodside Colliery

1829-1832	- 79,205 bu. coal) Royalty
	1,067 tons ") \$2173.27
	1,479 " ")

Frederick M. Bass & Company

1830-1832	- 114,215 bu. coal) Royalty
	933 tons ") \$2950.65

Maximillian W. Wythoff

1831-1832	- 18,189 bu. coal) Royalty
	2,311 tons ") \$2046.38
	17 " ")
	2,003 " ")

John Flannigan

1830-1832	- 12,018 bu. coal) Royalty
	267 tons ") \$549.09
	611 " ")

Henry C. Lyon

1831-1832	- 5,004 bu. coal) Royalty
	257 tons ") \$388.43
	488 " ")

Craven & Beach

1829	- 21,696 bu. coal) Royalty \$379.68
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Jacob H. Fisher

1832	- 342 tons coal) Royalty \$143.79
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Thomas S. Ridgway

1832	- 141 tons coal) Royalty \$59.48
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TOTAL	\$8,696.32
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For the year 1850, John W. Wetherill received \$59,432.54 royalty from 188,350 tons of coal mined from the Lec Lands. The average rent was 31 cents.

Future Development of the Anthracite Coal Field.

The concentration of interests has been the policy of the large corporations in connection with the mining and preparation of coal. Large breakers are replacing the numerous small breakers. One large breaker now does the work formerly done by the number of small ones.

Boiler plants of modern design have replaced the old cylindrical boilers formerly in use in scattered individual plants; and central pumping and drainage tunnels are now draining whole basins, where formerly a large number of small plants were required to do the work.

This concentration naturally tends to better management and a saving in fixed costs and in labor.

The electrification of many collieries is a still ^{further} economic consideration in replacing in many cases, the steam plants with the accompanying labor troubles in the boiler plants.

These economic measures have been made necessary from the fact that there has been a steady increase in the cost of production of anthracite coal while there has not been a corresponding increase in the demand for it.

In 1880 royalties were from 20 to 25 cts. per ton for prepared sizes. In many cases the sizes below Chestnut was not considered, as the small demand for these sizes at that time was not sufficient to market the supply produced. The surplus for many years later

was thrown on the refuse banks. Royalties are now from 40 to 50 cts. and in some instances even higher for prepared sizes above Pea with Pea 25 cts. and from 10 to 15 cts. for sizes below Pea.

In 1877 the average number of days worked in a year was 205. In 1897 it was only 152 and at present the Philadelphia and Reading Coal and Iron Company (one of the largest producers) operating days of these collieries was 187.

The cost of opening a colliery in the eighties was from \$100,000 to \$400,000. Now it requires an outlay of capital treble this amount.

In former years coal did not then have to be so clean and exact in sizing as now, from 12 to 15 per cent of bone being allowed in Chestnut and 8 to 10 per cent in stove as against 1 1/2 % slate and 3 1/4 % bone in Chestnut at the present time.

Hence at present a large percentage of the product which was formerly salable must be thrown upon the dump.

"In 1887 the average breaker output was 500 tons with a maximum of 1,800 to 2,000 tons while in 1897 the average of all breakers was 800 tons aday with a maximum of 2,600 tons and over, which maximum has been increased to 3,000 tons in 1900, while the complete cost of equipment of a colliery in the latter year was probably \$700,000.

In 1880, 88 per cent of the coal sold was of the size which sold at a profit, while in 1897 only 70 per cent of the total sales were of profitable selling sizes.

In 1877, 38 per cent of all coal mined was grate and larger sizes which required practically no crushing or preparation for sale. By 1887 this amount had decreased to only 26 per cent. In 1897 it

was 15 per cent".

"Extracts from U.S. Geological Survey 1900-1901 by H.H. Stoeks
Penn Anthracite Field."

With increasing cost of production and a declining market for Anthracite Coal, with the demands of labor and high freight rates, with the invasion of cheaper competitive fuels, and the cost of electric power diminishing yearly, it appears that a point will be reached when it will be unprofitable to mine Anthracite Coal, unless something in the future now unforeseen will cause lower costs of preparation and transportation that will allow an extended market for the coal trade.

In the early days of mining and as late as the seventies the market for anthracite coal included both North and South America, but its market has been so curtailed that at the present time it has practically been reduced to the Lake trade and to an area within a radius of approximately 300 miles. In all probability the market will still further be restricted to the immediate area surrounding the Anthracite Coal fields.

